RAILROAD GAZETTE

FRIDAY, MARCH 1, 1895.

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Contributions.

The Utility of the Drop Pit in Car Yards.

FEBRUARY 21, 1895.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Recently I have noticed in railroad papers illustrations of transfer pits for removing wheels from under railroad cars, without withdrawing the truck from under the car.

In the February 27, 1880, number of the *Railroad Gazette* will be seen an illustration, very plain and clear, of a wheelpit, several of which were in use on the Lake Shore & Michigan Southern prior to 1875. That kind of a pit proved itself so useful that it was considered right that others should have an opportunity of trying it, hence the illustration referred to. Take, for instance, a loaded freight car having under it Wood trucks or the Fox pressed steel trucks with long pedestals and the kingbolt covered with the load, to remove which would be laborious; the same is true of the inside pair of wheels in the diamond truck, the body truss rods being in the way of getting the old wheels out and the new ones in. By the use of the pit the old wheels are dropped down and the new ones brought in and put in the place of the old ones with very little labor.

One of these pits is in use at exchange street passenger station, Buffalo, N. Y. Mr. James How, foreman of passenger car work at that station, with his men, have removed a pair of center wheels from under a sleeping car, replaced the old with new wheels, and had the car ready to be put in the train in seven minutes from the time the car was put upon the pit.

On one occasion Jay Gould came into the New York Central station, Exchange street, with his private car from New York. One of the journals had been running hot; the inspectors discovered the journal to be rough. The L. S. & M. S. Ry. Co.'s train had been held past time to leave. Mr. Gould was on his way to St. Louis to be present the next day at a meeting of the directors of the Missouri Pacific. The car was put upon the pit, new wheels put under, and from the time the switching engine hitched on to the car until it had replaced it in the train only 14 minutes elapsed. The reader can judge for himself how much time was occupied in doing the work of removing and replacing wheels. It is strange that such a useful and simple device is not in use in every yard where wheels are changed. The use of compressed air is an improvement on the double screw telescope jack.

Some useful devices I find illustrated in the old files of the *Railroad Gazette*.

Freight Rates and the Law of Diminishing Returns.

STANFORD UNIVERSITY, Jan. 28, 1895.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The farmer is invariably the most clamorous for low railroad rates. He cannot be blamed for being importunate in this matter. To him the railroad is impersonal, conscienceless and arbitrary. The market fixes the prices, to a certain degree, which can be obtained for his produce. The cost of production is inelastic in many ways, and the only item in the cost at which his produce can be placed upon the market which is in any way elastic, or which seems capable of change, is the cost of transportation. No wonder, then, that the farmer, looking at the question in a superficial way, should demand a reduction in transportation price when competition seems about to ruin him.

The farmer fails to see that his business is inelastic, and that there is a definite limit beyond which low rates will no longer induce increased volume. This is not true of most other industries. So long as transportation prices remain a factor in the market price of a commodity not affected by the law of diminishing returns, so long will reduced rates cause that commodity to be offered for transportation in increased volume. The productivity of an agricultural region is limited; its profitable working is influenced by the fact that there is a point at which the farm will not yield returns equal to the expenditure of labor and capital upon it. No reduction of rates can affect this; all that reduced rates can do for an agricultural community, which can already reach a competing market and which is producing its maximum yield, is to bring new regions under cultivation, owing to the greater area which the diminished price of transportation makes tributary to a market, and so bring a greater total yield to the market, which will probably result in a diminution of market price.

ROBERT DONALD.

A Formula for the Maximum Train Load.

Pennsylvania Company,
WELLSVILLE, O., Feb. 13, 1895.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I beg to submit the following method for loading trains to the maximum capacity of a locomotive.

The problem is, how to load a train so that it can just be pulled at the required speed on the maximum grade or at the place of greatest resistance. For the practical solution of the problem it is unimportant to analyze the resistance of a train into its elements. It is clear that the total resistance varies neither directly as the number of cars, nor directly as the tonnage. It is equally clear that it is affected by both. That is, a certain part of the resistance of a car varies directly as the weight and the rest is constant whether the car is empty or loaded. This rationally accounts for the fact that the resistance of a loaded car is found to be less per ton than that of an empty car.

If, then, the relation between that part of the resistance which varies as the tonnage, and that which varies as the number of cars is determined, a correct basis for loading trains can be established. To determine this relation take two trains, one loaded and the other empty, both offering the maximum resistance. The tonnage and number of cars of each of these trains, if not already known, must be determined by trial.

Algebraically the problem may be solved as follows:

Let W = the weight of the loaded train, exclusive of engine, tender and caboose.
" W_1 = the weight of the empty train, exclusive of engine, tender and caboose.
" N = the number of cars in the loaded train.
" N_1 = " " " " " " empty "
" K = the resistance per ton, independent of the resistance per car.
" C = the resistance offered by each car independent of the weight.

The resistance of the loaded train then is $K W + N C$.
" " " " empty " " " $K W_1 + N_1 C$.

which both offering the maximum resistance to the engine are equal, then:

$$K W + N C = K W_1 + N_1 C,$$

and $K (W - W_1) = C (N_1 - N)$,

and $C = K \dfrac{W - W_1}{N_1 - N}$.

Let $L = \dfrac{W - W_1}{N_1 - N}$, the value of which is tons;

then $C = K L$.

Substituting in the first equation:

$$K (W + N L) = K (W_1 + N_1 L),$$

the two quantities in parentheses being equal and their value being tons, this value can be used as a basis for loading trains. In plain language, this basis is the weight of the train, plus L multiplied by the number of cars, and L is the difference of the weight, of the two trains divided by the difference of the number of cars.

This method is so easy of application that any one can understand it. For instance: On a certain division a certain class engine can haul 20 loads of iron ore, or 50 empties. The weight of a car is 13 tons, and of a car loaded with ore 43 tons, then

$$L = \frac{W - W_1}{N_1 - N} = \frac{860 - 650}{50 - 20} = 7 \text{ tons},$$

and $W + N L = 860 + (20 \times 7) = 1{,}000$ tons = basis for loading.

Instruction to yardmaster would then be as follows: "Add 7 tons for each car to its weight, including load, and give each train 1,000 tons." This basis may be varied for different kinds of weather.

Since $L = \dfrac{C}{K}$ its value will be different on different railroads, especially those having different grades, the value of K, including the resistance due to grade. It is best to determine the value of L on each division by experiment.

Most other methods have entirely neglected to consider partially loaded cars. With this method the proper share of resistance is allowed for each car, however it may be loaded, and I believe the application is simpler than that of any that has come to my notice.

L. G. HAAS.

Track Elevation in Chicago.

On the 18th inst. the City Council of Chicago passed, by a vote of 58 to 2, the ordinance providing for the elevation of the Galena Division of the Chicago & Northwestern Railway. This ordinance had been agreed upon by the representatives of the city and the railroad some two or three months ago, and had been pigeon-holed in committee since then. The only amendment to the ordinance as previously agreed upon was a provision for lighting the subways at the expense of the railroad company. The company has 30 days in which to accept or reject the ordinance, but it is believed that the ordinance will be accepted.

The conditions which have led to the adoption of this ordinance for the elevation of a small portion of one of the lines of the C. & N. W. Railway are well set forth in the report of Colonel Ellers, Consulting Engineer, on track elevation for the city, in his report to the mayor, dated Oct. 25, 1894. In this report Colonel Ellers says:

"The Chicago & Northwestern Railway Company owns and operates over 241 miles of track within the present corporate limits of the city of Chicago. It is the greatest railroad system within the city. . . . But comparatively a small proportion of the tracks forming its urban system is so situated as to be capable of elevation or depression, independently of the tracks of other railroads, which either parallel it, or that intersect and cross it at grade, or connect with it in all directions. This complicated condition finds an exception in that part of the main line or Galena Division west of California avenue, or of the Rockwell street yards, and extending to and beyond the western city limits. This portion of the system is entirely free of all complications, and hence the work of elevating its tracks and removing the crossings at grade between Sacramento avenue and West Fortieth street will be greatly simplified because the work can be prosecuted without disturbing the tracks of other railroad companies. East of Rockwell street the main line of the Northwestern is paralleled by the tracks of the Pittsburg, Cincinnati, Chicago & St. Louis, and the Chicago, Milwaukee & St. Paul railroads, the tracks of the latter company crossing at grade the tracks of the Northwestern between Diller street and Western avenue, from which point to the river but an imaginary line separates the tracks and right of way of the three companies. In view of contemplated improvements of an important character in this section of the city, it is deemed advisable, pending the same, to raise the tracks of that portion of the Galena Division of the Chicago & Northwestern Railway, situated between Sacramento avenue and West Fortieth street, a distance of 1.82 miles, which includes the length of the temporary ascending grade at the east end of the proposed work, and of the permanent descent at the western city limits. Through here are seven tracks which it is proposed to elevate from 10.5 to 11.5 feet above the surrounding streets and avenues. . . . Subways passing beneath the tracks, when the same are elevated as herein proposed, will be necessary, and will have to be constructed in Kedzie, Homan and St. Louis avenues, in Central Park Boulevard, in Hamlin avenue and West Fortieth street."

As stated in the report, the situation east of Rockwell street is complicated by the crossing of the Chicago, Milwaukee & St. Paul Railway, and the connections with and proximity of the P., C. C. & St. L. Ry., besides the branch of the Northwestern running to the Stock Yards and to its freight houses, elevators and yards between Fourteenth and Sixteenth streets, which diverges to the south near Rockwell street. East of Western avenue, half a dozen or more viaducts have been built carrying streets over the tracks of the Northwestern and other parallel roads. The construction of a few more viaducts would accommodate the street traffic fairly well in this region, so that it is doubtful if elevation of tracks will be undertaken on that portion of the line lying east of Western avenue. It has been suggested that the Western avenue viaduct be removed and the track elevation be continued a mile further east, but the details of this portion of the work have not been agreed upon, and owing to the complications previously mentioned it may be a long time before the track elevation is extended east of the limits provided in the present ordinance.

The ordinance as passed provides for the elevation of the railroad tracks 10 or 11 ft. above their present grade. Sub-ways are to be built at Kedzie, Homan, St. Louis and Hamlin avenues, Central Park Boulevard and West Fortieth street. Three of these avenues are to be 66 ft. wide between the abutments, and two of them 80 ft. wide. As the Central Park Boulevard is under the control of the West Park Commissioners, the details of the sub-way for its crossing are not laid down in the ordinance. The streets are depressed from 2¼ to 3⅓ ft. generally. In the case of West Fortieth street, which is crossed on the descending grade of the railroad, the depression is 6¼ ft. The clear head-room provided is generally 13 ft., but at Kedzie avenue it is made 13⅓ ft. to accommodate a trolley car line. It is thought that plans will be prepared immediately, so that with the opening of spring active work may commence. Between the subways the tracks are to be carried on earth embankments, and the subway floors are to be of the "solid" kind.

Two Recent Tests of Armor Plate.

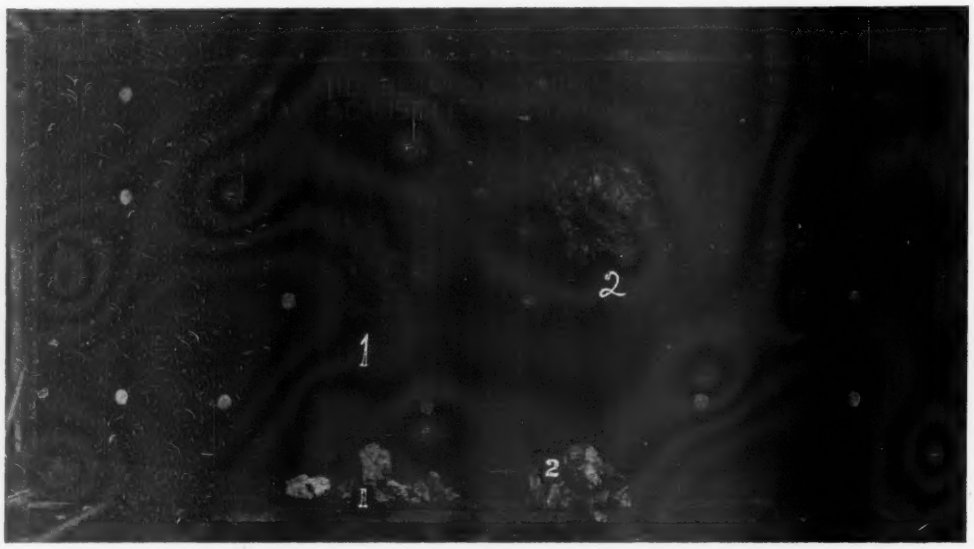
The latest reported tests of armor plate furnished by the Bethlehem and Carnegie companies show great results.

One of these was at the proving grounds of the Bethlehem Iron Co., at Redington, Pa., Feb. 19. A curved, Harveyized, nickel steel plate, 15 in. thick, representing armor for the battle ships Indiana and Massachusetts, was subjected to two shots from a 10-in. gun at a range of 250 ft.

The first shot was a 500 lb., 10 in., Carpenter projectile, of chrome steel, fired with 161 lbs. of powder, and having a striking velocity of 1,539 ft. per second, and a striking energy of 8,219 foot tons. The projectile entered the plate about three inches and broke up. There was no sign of cracking the plate. A second shot, with the charge increased to 241 lbs. of powder, and having a striking velocity of 1,940 ft. per second, and 13,060 foot tons striking energy, penetrated about five inches, but did not crack the plate. This shot was fired with the heaviest charge of powder ever fired at the proving grounds. Both projectiles were shattered, and their points welded into the plate.

A test was made Feb. 21, at the Indian Head proving grounds, of a Carnegie plate. This plate had been forged

down from 17 in. to 14 in., after the super-carbonizing of the surface was done. It was reheated, rolled down, and then the face was chilled in cooling by a spray of ice-water. It was expected that this treatment would minimize internal strains and toughen the plate. This plate, similar to those made for the barbettes of the new battle ships, was attacked by two shots from a 10-in. and one from a 12-in. rifle. The first, a 10-in. Carpenter



Effect of Two 10-in. Carpenter Projectiles upon a 15-in. Harveyized Nickel-Steel Plate.

projectile, fired with 217 lbs. of brown hexagonal powder and having a velocity of 1,859 ft. per second, and a striking energy of 11,996 ft. tons penetrated about six ins. and developed no cracks. The projectile broke up completely. The second shot, using 225 lbs. of powder, and having a velocity of 1,940 ft. per second, and 13,400 ft. tons striking energy penetrated about eight inches, and failed to crack the plate. A third shot was then fired from a 12-in. gun with 420 lbs. of powder, developing a velocity of 1,858 ft. per second. This projectile weighed 800 lbs. and had a striking energy of 20,370 ft. tons. It passed through the plate and entered the backing, but made no radial cracks. This was the test for a 17-in. plate, and these results from a 14-in. plate suggest that a lighter plate, treated in the new way, may possess as great resistance to cracking as a plate some inches thicker. The resistance to penetration is also increased, though in a smaller degree.

Bridges for the Chicago Drainage Canal.

Last October the Trustees of the Chicago Sanitary District advertised for designs and bids for swing bridges at Romeo, Lemont and Willow Springs highways. On the 31st of October bids for the bridges were received from 11 bridge builders, together with 14 bids for the masonry.

At the meeting of the Board held Nov. 14th, the Joint Committee on Engineering and Finance, to whom the bids were referred, made majority and minority reports. The majority report, which was adopted by the Board, recommended that all bids be rejected, the checks deposited therewith be returned to the bidders, and the Chief Engineer be instructed to prepare and submit plans and specifications for fixed spans of wood and metal.

At the meeting held Nov. 21 the majority of the Committee submitted a supplemental report giving its reasons for this proposed action. In this report it was contended that there would be no occasion to use swing bridges on the Sanitary District Canal until the Des Plaines and Illinois Rivers should be improved by the General Government and thus made navigable; that this would not be accomplished in less than 10 or 12 years; that the interest on the increased cost of swing over fixed bridges, together with the cost of operation, for a period of 10 years, would be sufficient to pay the expense of changing to swing bridges at the end of that time.

The minority report recommended that any action designed to determine further the nature of the bridge solution be deferred, as all the bridges could be built in a year, and the main channel will not be completed until late in 1896. Further, the minority said that building fixed bridges would be a reversal of the expressed policy of the Board, and to that extent a breach of faith with the people of the valley below; that it would be detrimental to the development of the large property interests of the Board; that it would handicap the efforts of those who are laboring for a waterway between the Lakes and the Mississippi; and that it would greatly increase the difficulties of the ultimate solution of the railroad problem.

It would appear to an outsider that the Board had been a little premature in asking for bids on bridges that would not be needed for two years at least, and that the estimates of cost of completing the main channel, which were at that time in course of preparation, had awakened it to the fact that under the present law the revenues of the district would not be sufficient to complete the canal, for about this time a spasm of economy seems to have struck the Board. Arrangements were made to reduce the engineering force about one-third, which have since been put in effect. The difference in cost of construction between swing bridges and combination fixed bridges was another straw that was eagerly clutched at.

The estimates for the main channel which have since been submitted indicate that the deficiency in revenue is much greater than any temporary saving on fixed bridges would cover, and that the Board will be compelled to ask for increased powers of taxation in order to complete the work in any reasonable time. This has long been apparent to far-seeing men who have studied the problem, but it seemed to dawn gradually on the minds of the majority of the Board.

In the case of a work of such immense consequence to the health as well as to the commercial interests of all future generations of Chicagoans, it would seem but just that a great part of the cost of construction should be distributed over a long term of years by the sale of bonds.

The bridge question seems to be in abeyance for the present.

Canals in New York.

We take from the annual report of the New York State Engineer and Surveyor, for the year ending 1894, the following facts concerning the canals in the State:

The State canal system comprises about 640 miles of navigable canals, 80 miles of unnavigable feeders, 261 locks, 33 aqueducts, 1,100 bridges, 93 waste weirs, 365 culverts and many minor structures. Of these the Erie and Champlain canals show, after 12 years of free canals, a surplus of earnings over cost of $23,068,911.25. All the other canals together have cost $32,115,764.03 more than they have earned, leaving a deficit of $9,046,852.78 over the surplus earned by the Erie and Champlain canals.

The Canadians, profiting by our example, have captured, with less than 50 miles of canal necessary to provide continuous navigation from the Great Lakes to the ocean, a large portion of the northwestern commerce which was once wholly ours. This route is now available for vessels of 9 ft. draft, but is being rapidly increased to 14 ft.

The fact that our canals are waning in importance is not wholly due to the progress of the railroads and other rivals of canals, but largely to the wonderful lack of progress of the canals themselves. Strangely enough, only 55 of the 1,243 canal boats which cleared from Buffalo during 1894 were propelled by steam and none by electricity. Practically the only advance made in the method of towing in the past 70 years consists in harnessing three horses to draw two boats instead of two horses to draw one boat. Poor methods of construction and neglect have allowed the canals to deteriorate, so that the cost for improving poor work exceeds the cost of new and desirable structures. Except for very few and irregular improvements the canals are identical with those of 70 years ago.

A ship canal replacing the Erie or the Oswego and Erie canals has found no considerable body of business men, canal men or financiers to support it as being expedient. We need prompt improvements, for the present at least.

The following items are recommended as subjects for improvement: (1) Wherever possible, without radical changes in existing structures, the deepening of the Erie and Oswego canals to 9 ft. and of the Champlain to 7 ft. (2) The lengthening and equipping, when desirable, with proper hydraulic machinery for operating lock gates and drawing boats in and out of locks, of all single locks on the Oswego canal, and those on the Erie which cannot be replaced by high-lifting locks. (3) Combining where practicable several locks into one quick-acting, high-lift lock, thus saving much water in lockages as well as time and expense in operating and maintenance. (4) Greater speed and economy in towing through electrical propulsion. (5) Increasing the capacity of existing boats, by making available for cargo, space now used for horses or steam engines. (6) The reduction of cost of maintenance and operation by the introduction of more modern methods and appliances.

Since each half foot of deeper immersion of the present boats will permit of 25 tons increase in their cargo, I am convinced that improved gates could be placed in all existing locks, entirely dispensing with miter sills projecting above the floor of the locks, thus adding about one foot to the available depth of water. These gates could be built of steel and could be lifted vertically by means of the same machinery used to haul boats in and out of locks. A lock equipped with such gates, thereby permitting the passage of boats 10 ft. longer than at present, would require less water than now, because the additional length of boat would displace a corresponding quantity of water which is now wasted.

In completing the improvements of the Champlain, Canal now under contract, about 28½ miles of this canal will be enlarged. The greater portion of the enlargement will have a uniform depth of 6 ft. with 44 ft. width at bottom and 58 ft. water surface. This leaves about 36½ miles of unimproved canal. It is recommended that the entire canal be so enlarged as to have a uniform depth of 7 ft.

A plan to abandon the 3¼ miles of the present Erie Canal from lock No. 18 to the junction with the Champlain Canal at West Troy, and to use in place of this the 2½ miles of the Champlain Canal from the junction up to the guard lock at the south end of the Cohoes dam has been proposed. The plan further proposes to canalize the southern side of the Mohawk River up to a point just below the high falls and nearly opposite lock No. 18. From here to the present canal, 350 ft., would be covered with a steel acqueduct of suitable size, which would carry the waters of the canal to a point over the river bank where the lifting locks would be placed. These locks would be of steel and with 140 ft. lift. The plans for these structures are still by no means complete. The lifting device, which seems to promise the best results, is simply a surcharge of water sufficient to overcome by its weight the friction in the movable parts and to overbalance the counterweights when the lock is to descend and to be decreased to a corresponding extent less than the counterweights when the lock is required to rise. This water could be added at the upper level by stopping the lifting lock slightly below that level and opening the gates; thus overloaded the lock will descend by its own weight. It will be governed by air brakes or in any way which might hereafter seem more desirable. Pneumatic or hydraulic buffers at the lower level would prevent shock.

The five combined locks at Lockport offer a fine opportunity for combination into one steel lock similar to those just described. Locks No. 21 and 22, which could hardly be lengthened in the ordinary way because of the proximity of the upper Mohawk aqueduct and also because of the sharp curve which turns almost a right angle between the present locks, could also be combined into one high-lifting lock similar to those described.

Regarding electric propulsion of canal boats a trolley motor running on its own tracks on shore attached to tow lines as now used seems to promise the best results. Such power could be rented when it was needed. Such lines could be built on either side of the canal or preferably as a double track on the outside of the tow-path and above it, so that animals could pass underneath the lines running to the boats when towing by the present methods.

In connection with this report, we may say that a bill, proposing to submit to the vote of the people of New York State next November the question of bonding the State for $9,000,000 to improve the Erie, Champlain and Oswego Canals, was passed by the Assembly on Feb. 19, by 82 votes to 31. On Feb. 21, the Senate also passed this bill. As a result, it is probable that the state canals will be considerably improved in the near future.

Rapid Transit in Boston.

Rapid transit in Boston has advanced to the bidding stage; that is, the Commissioners have advertised for bids for the construction of the first section, and in giving out the advertisement they prepared a statement for the press which has been printed at length in the Boston newspapers. The description of the plan for this section which follows below, is condensed from the statement of the Commissioners:

The principal feature of the plan is a system of two and four track subways under Tremont and contiguous streets in the congested district. The plans for these subways contemplate a steel structure. Steel posts will carry girders, which in turn support an arched brick flooring. This plan recommends itself both because of the present cheapness of steel and the fact that masonry arches are liable to collapse when the lateral pressure is removed, as might be the case in laying water mains, etc. The standard height fixed on is 14 ft. from top of rail to roof. The width for two tracks has been fixed at 24 ft., and for four tracks, 48 ft. The four-track subway will have a line of columns along its center. The top of the rails will be about 17 ft. below the street level, necessitating a descent for passengers of 16 ft., somewhat less than the height of New York elevated stations. The platforms will be island platforms, making it unnecessary for passengers to cross the tracks.

The part to be built first will extend from Shawmut avenue and Tremont street, down Tremont street to Boylston, thence under the mall of the Common to Park Street Church, thence under Tremont street to Scollay square, and from there to a terminal at the Union station. This will comprise about 1¾ miles of subway. In addition to this, a line from a point near the junction of Church and Boylston streets, running along Boylston

street, under Charles street and the Common, to a junction with the first line at Tremont street, will be built.

Two tracks will be built at first from the junction of Tremont and Boylston streets to Tremont street and Shawmut avenue, but the subway will be capable of enlargement to four. Two tracks only will be built from Park Street Church to Scollay square. If additional tracks are needed here, either a sub-subway will be built, or another route will be chosen for them. This need not be the case if Tremont street is widened, admitting of a four-track subway here, as it now does along the line of the Common.

An unusual feature in the plans is the provision whereby tracks for cars going in opposite directions never cross. This is effected by building sub-subways. For instance, a car ending its trip at, say, Park street, passes, by a loop, from the inbound to the outbound track by going under the intermediate track instead of crossing it.

The subway will be ventilated artificially and lighted by electricity. This lighting current will be separate from that used for motive power and for lighting the cars. Drainage is provided for by drains laid in the ballast to the lowest points, at which points pumps will be located. Dryness will be secured by a concrete invert, and by covering the sides and top of the subway with a waterproof coating; also small drain pipes will be placed in the earth filling back of the walls.

The specifications for section 1 call for 400 ft. of inclined approach, 700 ft. of two track subway, 470 ft. of four track subway, 50,000 cu. yds. of earth excavation, 43,000 cu. yds. of surplus earth to be removed, 1,020 tons of iron and steel to be set in place, 11,600 cu. yds. of granite, brick, and concrete masonry, 20,000 ft. of spruce lumber in foundations, and 40,000 ft. of spruce piles.

Metal Tender Frames on the Michigan Central Railroad.

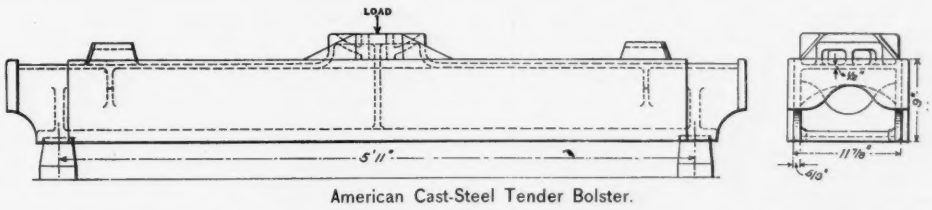
Several years ago the Michigan Central Railroad put into service some metal tender frames made of angles, 4 × 6½ × ¾ in. thick. These frames are shown by the illustrations. After hard service they are in good shape and no changes will be made in future designs except to increase the length of the centre pin castings where attached to the angles. The new length is 32 in., as shown. The Thurmond swivel tender hook, with a vertical plane coupler, is used in place of a plain drawhead at the back end.

The frame is made of four angles running lengthwise and joined at the ends by a ⅝ × 7-in. plate, bolted to the angle irons by knees. Wooden bumpers are placed outside of these plates. Over the centre pin there is a 20 × ⅜-in. plate extending across the frame, and in the centre there is a cross plate 48 in. wide and $\frac{5}{16}$ in. thick, extending from outside to outside and riveted to the angles. At the centre pins, between the centre and side sills, there are two 7 × ¾ in. braces, with bent ends, placed vertically on each side, and to these the side bearing castings are attached. Between the centre sills at both ends there is a cast-iron filling piece, which at the front end serves as the draw-head to connect with the locomotive. Four 1⅜-in. rods extend through from end to end to hold the drawhead and to take the pull. The two lower rods have eyes to which the safety chains between the engine and tender are attached. The details of construction are well shown by Figs. 1 to 5 inclusive.

It is noticeable that the use of metal tender frames is increasing and it is important that the severe service on the Michigan Central has brought out no defects in these frames which have been designed by Mr. Smart.

Cast Steel Tender Bolster.

The American Steel Casting Company has recently made a number of steel bolsters for use on tenders, for the Chicago & West Michigan, the Detroit, Lansing & Northern, and the Saginaw Valley & St. Louis railroads. These bolsters are of cast steel, and embody in one single casting the many different pieces as found in other bolsters. In the M. C. B. report for 1894, the committee on freight car trucks reported that in its opinion the American cast steel bolster truck "has some practical features, as it does away with many pieces." Recent tests of the



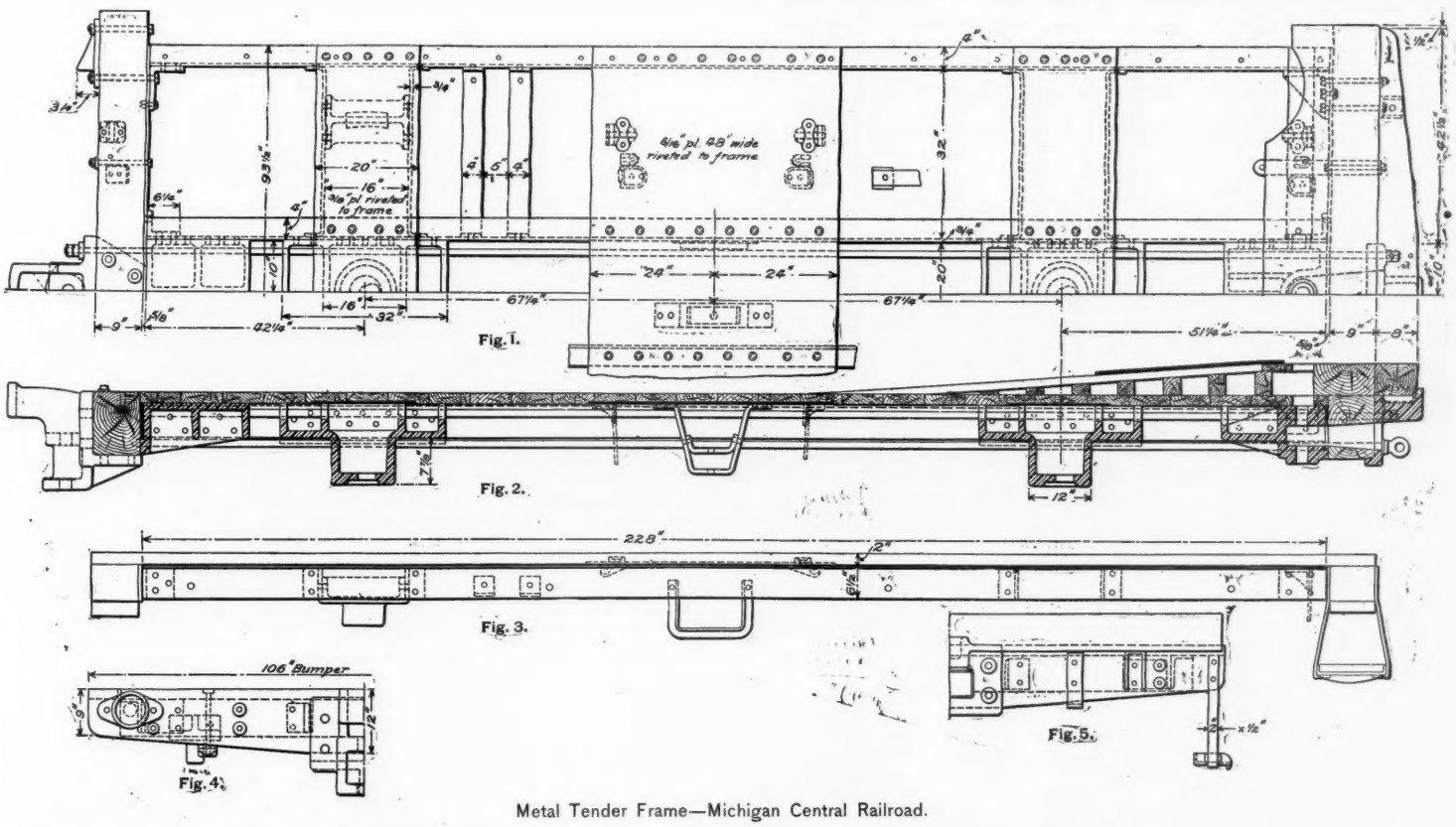
American Cast-Steel Tender Bolster.

bolster above mentioned have been made at the works at Alliance, O., which show some important results.

As is seen in the accompanying engraving, the bolster was supported at two points, 5 ft. 11 in., center to center of supports, and pressure was applied on the center plate by means of a 6-in. ram. The bolster itself is 9 in. deep, 11⅞ in. wide, with ⅝ in. thickness of sides, and ½ in. thickness of top. It weighed, complete, 580 lbs. The loads and deflections were as follows:

Tons.	Deflection.
40	¾-in.
64	1¼ "
90	1⅞ "

The limit of the machine used was 95 tons, and, although two men were kept steadily sledging the bolster up to this pressure, with 20-lb. sledges, at points about half way between the supports and the center, they were unable to break it. When the pressure was removed, a permanent deflection of ¼ in. was observed in the bolster. These results indicate a great stiffness, with no probability of any load coming upon the side bearings while in use. The tests compare well with those we gave on Jan. 25 of the Schoen bolster. Those tests were of freight car bolster trucks, and gave results up to 162,500 lbs., at which pressure a deflection of 1.95 in. was observed. It is, of course, true that a built-up bolster would give a greater deflection than a solid casting, and further, the American bolster is heavier than the usual freight car type, but, even considering these facts, the American bolster, as tested, gives results which indicate that it has no superior in this respect among the forms now in use.



Metal Tender Frame—Michigan Central Railroad.

The New York State Topographical Survey.

Since 1893 the State of New York has coöperated with the United States Geological Survey in making a topographical map of the State. This work was inaugurated in pursuance of chapter 287 of the laws of 1893, which authorized the State Engineer and Surveyor to coöperate with the Director of the United States Geological Survey in making a topographical survey and map of the state. Twenty-four thousand dollars was appropriated for this purpose, together with a further appropriation of $6,000 for locating the boundary lines between the several towns and counties in the state. The work was based upon the triangulation of the United States Coast and Geodetic Survey, the United States Lake Survey and the New York State Survey. Wherever the triangulation was deficient it was supplemented by the United States Geological Survey. The map is upon a scale of 1 to 62,500. The hypsography is shown by contour lines, with vertical intervals of 20 ft.

The work of marking town and county boundary lines was completed in the fall of 1893. The $6,000 appropriated was entirely expended.

The maps as now published are printed on sheets approximately 13 × 17 in., and contain each from 215 to 225 sq. miles, according to latitude. As the area of the state is 50,000 sq. miles the publication of the entire atlas will require between 250 and 260 separate sheets, making allowance for border sheets containing only portions of the state. There were surveyed during last year 600 sq. miles, at the rate of $5.79 per mile. The cost of plotting this work during the ensuing winter will bring the total cost for 600 sq. miles up to $5,450, which is at the rate of $9.09 per sq. mile. The cost of this to the state will be at the rate of $2.83 per sq. mile. Up to date one-fifth of the area of the state has been mapped. The work has averaged in cost $10 per sq. mile. On the basis of an annual appropriation by the state of $25,000, the entire work can be completed within eight years. A great gain to the state in co-operating with the United States Geological Survey, is that the engraving and publishing of the maps is done by the general Government without cost to the state.

It will be a great advantage to have the county and town boundary lines positively marked, thus avoiding tedious and expensive litigation, involving the ownership of private lands, and the rights of corporations and municipalities. When the location of such lines is determined only by such temporary marks as stakes and blazed trees, the work of recovering such lines becomes difficult and expensive.

The report of the State Engineer, from which we take these facts, concludes with a recommendation for the continuation of appropriations for this survey. One would suppose that it would be an easy matter to get such appropriations in a great, rich and intelligent community like the state of New York, and ordinarily it would be. But, unfortunately, the matter is complicated in that state by a sort of personal politics; that is, there is a rival enterprise which seems to be practically a one-man enterprise, in the interest of which a bill making an appropriation has been brought in, and it is very possible that the success of this latter bill will kill any appropriation for the continuation of the topographical work of

the State Engineer's office. We should regard such a result as unfortunate for the state and an uneconomical in the use of the people's money. The so-called "state survey" or "Adirondack survey" has, we believe, produced no visible results yet, and has cost the state about a quarter of a million. The coöperation of the state with the Federal Government, through the State Engineer's department and the United States Geological Survey, promises the greatest economy of money and energy, and offers the best opportunity for New York to get a good map of the State quickly and cheaply; and, strange to say, the "Empire" State, the center of wealth and intelligence, has never had a respectable topographical map.

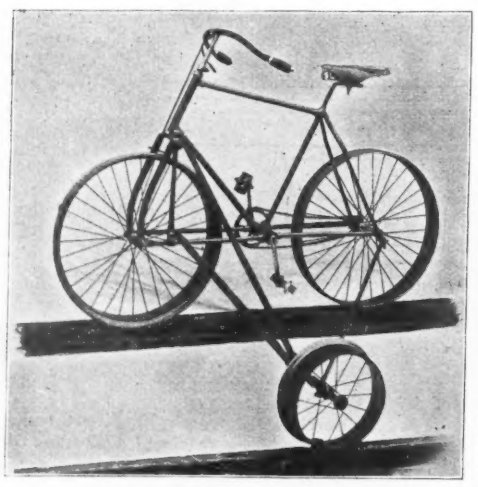
The New Kalamazoo Railroad Tricycle.

Recently in looking over the official reports of the Commissioners of Railways of New South Wales we were struck with the importance which the Commissioners attach to the use of tricycles and light hand cars. In the seven years that the present commission has been in control it has made great economies in various directions

The Kalamazoo "Safety"—Rigged for Two Men.

and added much to the efficiency of the railroads of the Colony. In speaking of the improvements in the methods of the maintenance of way department the Commissioners say: "We have supplied every ganger of fettlers [section foremen] with the tricycle, to enable him to move speedily over his section and have also equipped the gangs with a new description of light hand car to enable them to move rapidly with their materials from point to point. By the aid of these facilities, with a largely reduced staff, equally efficient service has been obtained. The number of inspectors has been largely reduced," namely, from 58 to 35. The total number of section men was reduced, notwithstanding an increase in the length of line, from 2,218 to 1,610, the saving in wages amounting to £67,486. We do not know precisely how much of this saving has been due to the use of the tricycles and light hand cars, but from the context of the document the Commissioners would seem to attribute very great importance to these means of economy. This gives an unusual interest to the examination of machines of this character and makes especially interesting the light "safety" which the Kalamazoo Railroad Velocipede & Car Co., of Kalamazoo, Mich., has recently brought out.

This machine is shown in the two engravings, one of which shows it with an extra seat and foot-rest in front of the steering head, on which a man can ride if necessary. The machine is light and speedy, and, it is said, is as easily propelled as a road bicycle, which we should suppose might be true, for the resistance is very much less than that offered to pneumatic tires by the best macadamized road. The machine is similar in its parts to the road bicycle, being fitted with ball bearings, a Garford saddle, or its equivalent, and with materials and fittings in general such as are used in the construction of high-grade road wheels. The frame is of No. 16 gage, Shelby, seamless steel tubing, with drop forgings, brazed. The large wheels are 24 in. in diameter, and each has 32 No. 12 gage tangent spokes. The wheel rims are of No. 16 gage tire steel, beaded outward on the outer edge and inward at the center to give stiffness. The front and small auxiliary wheels have re-enforced flanges made to the M. C. B. standard, and the front wheel admits of slight movement through the handle bar, making it possible to pass at speed around any curve and over imperfect or worn frog points. On tangents the flange of the forward wheel can be turned from the rail, it is said, thus saving friction. The rear wheel has no flange, the tread being wide enough to avoid danger of derailments. The auxiliary wheel is 11 in. in diameter, has a flange and is otherwise similar to the larger wheels.



The Kalamazoo Railroad "Safety."

An ingenious feature of this machine is the arrangement by which the auziliary wheel can be folded back against the frame, thus reducing the machine to the space occupied by an ordinary road machine. This arrangement will be easily understood from the engravings made from photographs.

The treads of all wheels are provided with continuous rubber bands 3-16 in. thick and 3 in. wide. This should add very much to the comfort as well as to the speed of the machine, preventing slipping and minimizing the pounding on the rails. These bands also make the car noiseless, thus permitting the rider to hear approaching trains.

It is claimed that a speed of 20 miles an hour or more can be made on a level track. Of course, the gear can be changed, exactly as it can be on road machines. The weight of this railroad safety is 55 lbs., or 60 with the attachment to carry the additional man.

Abolition of Grade Crossings in Massachusetts.*

Mr. Rollins began with an entertaining account of the state of public sentiment in early days, when railroads were such a novelty and so greatly desired that people looked upon a crossing as rather an advantage than otherwise, as it gave them a good chance to see the engine and cars. He then turned to the situation at the present day, when there are 2,165 crossings in Massachusetts, on which there were killed or injured during the 11 years 1879–89 an average of 43 persons yearly. With some realization of this fact the Legislature voted in 1890 to spend $5,000,000 in getting rid of grade crossings; and yet with remarkable fickleness the same body goes on granting charters to electric street car lines with the greatest freedom. The right of way is given to these companies for nothing, and the people seem to be as glad to encourage this source of danger now as they were to permit the construction of railroads across highways in the years between 1830 and 1860. The inconsistency of the public, as indicated by the action of its representatives in the Legislature, is strikingly illustrated by the fact that in one year (1893) 76 persons were killed or injured at crossings of steam railroads, while in the same time 595 persons were killed or injured by electric cars on public highways. It is just as certain that public sentiment must be reversed on this subject as that it has been reversed from the position of 1830 in the matter of crossings. Mr. Rollins thinks that the public is beginning to see the situation already, and he hopes that Massachusetts will pass a law like that recently enacted in Connecticut, prohibiting the crossing of a steam by an electric road at grade.

The speaker then sketches the course of legislation in Massachusetts, where a law was passed as early as 1849 looking to the amelioration of the danger of the crossings of railroads with each other at the north end of Boston. In 1876 the establishment of new crossings without the consent of the railroad commissioners was forbidden, but many crossings have been permitted since then, the commissioners holding, in view of numerous acts of the Legislature, that public sentiment demanded suspension of the rule. As late as 1893 the Southbridge, Sturbridge & Brookfield Railroad was authorized to cross five highways, the commissioners believing that the charter of the road, as granted by the Legislature, could not be carried out with this permission.

In considering the cost of abolishing grade crossings in Massachusetts Mr. Rollins takes the estimate of the Railroad Commissioners, made in 1884, which is $100,000,000.†

Of the 2,165 crossings in the State about 1,000 are protected, at an approximate cost of $500,000 a year. This is equal to the interest at 4 per cent. on $12,500,000. Taking the sums paid by the railroads on account of accidents at crossings and capitalizing it in the same way, and adding it to this, we shall have the sum the railroads can afford to pay for removing 1,000 crossings, and as they generally pay 65 per cent. of the cost, this calculation shows that about $20,000,000 could be thus spent; this is 10 or 15 per cent. of the total capital stock of the companies, but even this would not meet the case, for the 1,000 crossings now protected by gates or flagman are in the more thickly settled places, and on the larger roads; and the cost of their removal would be much more than $20,000 each.

When we come to take individual crossings or groups of crossings the problem is still more perplexing. The work now soon to be begun on the Providence Division of the Old Colony at and near Boston will abolish 12 crossings, but the cost will be $3,500,000, or nearly $300,000 for each crossing.‡ The cost for protecting them at present is $20,000, which, capitalized, equals $500,000, only about one-seventh of what it is going to cost to make the improvement. But of the $3,500,000 to be spent here, the railroad company must pay 55 per cent. (under a special law), or something like a million and a half more than the capitalized cost of protecting the crossings in their present condition; for this large sum, for which the annual interest charge will be nearly $60,000, the company gets go additional income.

On this road, the Old Colony system of the New York, New Haven & Hartford, there are now four costly schemes under construction which will cost altogether some $6,000,000; these are, besides the one just mentioned (from Chickering to Mt. Hope), Dorchester avenue, Boston; Dover street, Boston; Brockton. In addition to these Fall River, Taunton, New Bedford, Attleboro and Clinton will soon begin action on plans costing probably $5,000,000 more. This makes a total of $11,000,000, of which the railroad company's share is $7,150,000, equal to more than half its entire capital stock; and the road has no way of getting this money except from the public in fares and freight, the rates on which the same public is all the time clamoring to have reduced. And all these millions must be spent to undo work which originally was done to the satisfaction of the public.

Passing to the methods of carrying out the law of 1890, Mr. Rollins says city engineers often unwarrantably increase the cost of a change in grades by insisting upon unnecessary head room. After many years' observation he concludes that a clearance of more than 14 ft. for an underway is very rarely necessary. Teamsters who carry high loads of empty barrels, etc., can readily accommodate themselves to lower head room, and pile-drivers and other things which use a road very unfrequently can generally go some other way without much trouble. If a railroad is carried 1 ft. too high millions of passengers and of tons of freight have to be lifted this unnecessary height every year. Taking an example near Boston, 2¼ millions of passengers in 50,000 trains, carrying, in addition to passengers, 1½ millions of tons of freight must be raised this additional height every year to accommodate possibly 1,000 teams under the bridges, and the loads on these teams could be readily adjusted by a delay of 10 minutes each. To make the comparison clearer, let the reader say whether he would like to travel up 2,225,000 ft. or 4,450,000 steps of 6 in. each in a year for the sake of saving the teamsters $167 worth of time. Again, the principal highways from large towns are parallel to the railroads and the great bulk of the teaming does not cross the tracks at all. A teamster having been caught once with a high load will not be caught a second time, and in a year or two all trouble will be over.

*Abstract of a paper read before the Boston Society Civil Engineers, Dec. 19, 1894, by J. W. Rollins, Jr.

† This is more than twice the sum estimated by the special commission of engineers which reported in 1889. The commissioners' estimate seems to have referred only to the crossings in cities and the populous parts of towns, while the smaller estimate of the special commission included all the crossings in the State except three.

‡ The estimate for the total cost of the improvement doubtless includes new stations, additional tracks and other improvements not strictly chargeable to the crossings.

Electric Motors on the Pennsylvania and the New Haven.

The New York, New Haven & Hartford Railroad has so far completed its plans for the equipment of the Nantasket Beach Railroad with electric motors, that the contracts for construction have been awarded. This road is a branch, about seven miles long, connecting the South Shore Division of the Old Colony System with Nantasket Beach. During the winter season there are only three trains daily each way, but in the summer there is a large passenger business, there being a half dozen or more seaside stations. An officer of the road gives us the following particulars concerning the electrical equipment:

We expect to have the Nantasket Beach road in full operation about the middle of May. We have contracted for two Green engines, each 820 nominal horse-power, and for eight horizontal tubular boilers with return flue, and two direct coupled generators, 500 kilowatts each, made by the General Electric Company. We propose to use a 0000 copper trolley wire with naked feed wires carried upon iron arms bolted to Southern pine poles, 30 ft. long, 12 in. × 14 in. at the butt and 10 in. × 12 in. at the top. These poles are to be set between the tracks, which are 13 ft. apart on centers. The rolling equipment is to be made interchangeable with our standard cars, and at first will consist of six motor cars. Each car will have two motors of 100 H. P. each, nominal capacity. These are expected to draw with ease a trailer car. Both the motor and the trailer cars are 50 ft. in length. They are open cars, will be lighted with electricity, and will be entered from the side. In addition to these we are preparing four baggage cars 30 ft. in length, of which two are to be fitted with two motors and two with four motors, all of General Electric Company's construction. By loading these baggage cars and so increasing their tractive force we expect to determine the efficiency of special motors.

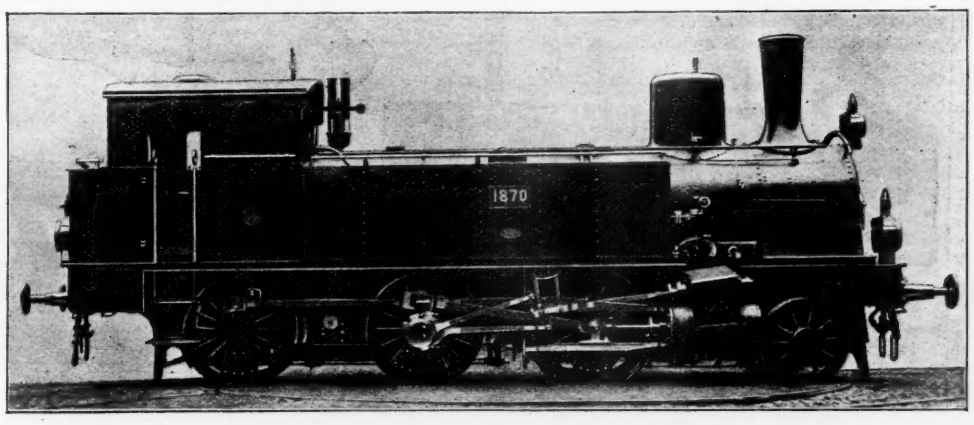
Burlington and Mount Holly Line.

The plans of the Pennsylvania Railroad in substituting electric motors for steam locomotives on a short branch in New Jersey, so long talked of by local newspapers, have finally materialized, and the company has now decided to try electricity on the branch road between Burlington and Mount Holly, about seven miles long. The number of trains on this branch at present is six a day each way, but there would seem to be opportunity to increase business by running additional trips, as there are about 20 trains each way daily on the main line of the Amboy division, with which this branch connects. The business of the branch is exceedingly small, however, for the reason that *both* its termini have direct connection with Philadelphia by main lines. The company will build one or more new passenger cars, each of which

will be equipped with a 75 H. P. motor wound for a speed of 50 miles an hour. An overhead trolley wire will be used, but the fixtures will in no way obstruct the line so as to prevent the use of steam locomotives for freight or heavy trains, as at present.

Eight-Wheel Tank Locomotive for the Prussian State Railroads.

The locomotive shown in the accompanying illustration represents a type constructed by the Union Foundry Locomotive & Engineering Co., of Königsberg, Prussia, for the Prussian State railroads, for service on branch lines and on short sections over which heavy freight has to be transported. As will be seen, the engine has six wheels coupled, four under the boiler and two to the rear of the firebox. The front pair of wheels runs on a radial axle box of the Adams type. The water supply is stored in three tanks, two being situated at the sides of the boiler, the third being suspended between the frames, above the front coupled pair of wheels.



German, Eight-Wheel, Tank Locomotive.

The front radial axle has a play of 40 millimetres on each side, due allowance being made for this in the frame plate. Both axle boxes consist of a cast-steel piece, the axle being held in its middle position by means of a spring. All parts of the engine which are subject to friction are either of hardened material or are brass-lined.

At a speed of 60 kilometres (38 miles) per hour, the engine runs quietly and takes curves quite easily without shock. That it has given satisfaction is found from the fact that many additional orders have been received for this type of locomotive. The following are the leading details of the engine:

Diameter of cylinders		16.93 in.
Stroke		21.81 "
Diameter of driving wheels	4 ft.	4.47 "
" " running "	3 "	2.58 "
Wheel base of coupled wheels	13 "	9.35 "
Total wheel base	21 "	7¾ "
Heating surface of fire-box	7.26	sq. metres
" " " boiler tubes	98.34	" "
Fire grate area	1.58	" "
Steam pressure	180	lbs. per sq. in.
Capacity of water tanks	5.8	cu. metres
Coal supply, carrying capacity	1¼	tons
Total weight of locomotive, full	52½	"
" " " " empty	40	"
Adhesion weight	40.7	"

The National Arbitration Bill.

Last Tuesday the United States House of Representatives passed, under a special rule, the bill introduced by Mr. McGann, of Illinois, to establish the practice of arbitration between railroad companies and their employees. This bill we have noticed before, but now that is has passed the House we give a more careful synopsis of its provisions, although it is not yet a law by any means, for it has to pass the Senate and the President.

In brief, the bill provides for the appointment of a Board of Arbitration, consisting of three persons, to decide controversies between Interstate carriers and their employees and makes the awards of the Board enforcible in the United States Courts acting as courts of equity.

It was stated in the debate that the various labor organizations interested had agreed to become incorporated, thus becoming liable for damages at law. It was also stated that the bill was recommended by the leaders of all the railroad organizations, by Mr. Carroll D. Wright, the Commissioner of Labor, and had been revised by the Attorney-General.

By the terms of the bill the word "employee," as used in the act, covers all persons actually engaged in any capacity in train operation or car service. It is provided that wages shall be reasonable and just, but this does not affect the right to make contracts for wages not in contravention of the provisions of the Act. Whenever a controversy arises, the Chairman of the Interstate Commerce Commission and the Commissioner of Labor, shall at the request of either party use their best efforts to settle the controversy, and if such efforts are not successful, they shall at once bring about arbitration under the provisions of the Act. The carrier directly interested shall appoint one arbitrator, the employees another, and these two shall choose the third. But if they fail to choose the third within forty-eight hours, he shall be named by the Chairman of the Interstate Commission and the Commissioner of Labor. In submitting the case, the parties to the controversy shall stipulate that, pending arbitration, the existing status shall not be changed; that the parties to the award shall faithfully execute it, and that it may be enforced in equity; except that no employee shall be punished for his failure to comply with the award as for contempt of court. They shall stipulate also that employees dissatisfied with the award shall not, for that reason, quit the service before the expiration of three months after the award, nor without giving 30 days' notice in writing; nor shall the employer dissatisfied dismiss any employee on account of dissatisfaction with the award within the above time limits. The award shall continue in force for one year after it goes into practical operation, and no new arbitration on the same subject shall be had until the expiration of that year.

The Chairman of the Interstate Commerce Commission and the Commissioner of Labor shall decline to call a meeting of arbitrators at the request of any body of employees not acting through a labor organization, unless it can be shown that these employees are a majority of those in the service of the same employer, of the same grade and class; and unless the award can justly be regarded as binding upon all such employees.

During the pendency of arbitration no employer shall discharge employees, parties thereto, except for inefficiency, violation of law, or neglect of duty; nor shall the employees unite in, aid or abet strikes or boycotts; nor may the employer discharge an employee, party to the arbitration, during the period of three months after the arbitration, except for the causes above mentioned, without giving 30 days' written notice; nor may employees during a like period quit the service without just cause or without giving 30 days' written notice; nor may any organization representing employees, order, counsel or advise otherwise than according to the provisions of this section. Any violation of this section shall subject the offending party to liabilities for damages.

In every incorporated labor organization it must be provided that a member shall cease to be such if he participates in, or instigates force or violence against persons or property during strikes, lock-outs or boycotts, or if he seeks to prevent others from working, through violence, threats or intimidation. An employer may not require any person seeking employment to enter into an agreement not to belong to a labor organization; nor may he discriminate against any employee because of such membership; nor may he require his employees to contribute to any benefit fund; nor may he unlawfully attempt or conspire to prevent a discharged employee from obtaining other employment. Such acts constitute a misdemeanor, and carry liability to fine of from $100 to $1,000. The necessary money to pay the expenses of arbitration is appropriated out of money in the treasury not otherwise appropriated, subject to the audit of the Chairman of the Interstate Commerce Commission.

A Proposed Street Car Seat.

A form of street car seat has been patented by Mr. G. B. Bolton, of 23 Court street, Boston, embodying some very desirable features. As shown in the engraving, the seats have curved backs providing comfortable shoulder room, and present no dangerous division arms.

The cushions are made with springs, and can be readily

taken out and cleaned. The skeleton seat frame allows all dust and dirt to fall to the floor. The arrangement of these seats admits of two more persons being seated in an 18-ft. car than with ordinary seats, and this without crowding. The continual moving to make more room is avoided, as is the wear upon upholstery which this entails.

Train Accidents in the United States in January.

COLLISIONS.

REAR.

4th, at 6 a. m., on Central Vermont, at Pittsford, Vt., a freight train descending a grade broke in two and the rear portion afterward ran into the forward one, derailing several cars which fell against the station building and upset the stoves therein. The passenger station, house and several loaded freight cars were burned up.

5th, 3 a. m., on Lehigh Valley, at White Haven, Pa., a freight train which had stopped near the foot of a grade was run into at the rear by a following freight, which became uncontrolable, making a very bad wreck. Two drovers in the caboose were killed and a brakeman was injured. A loaded car fell down a high bank and lodged on the tracks of the Central of New Jersey.

12th, 7 a. m., on Cleveland, Cincinnati, Chicago & St. Louis, at Cincinnati, an express train which had been stopped in the yard was run into at the rear by a local passenger train, badly damaging several cars. Four passengers were injured. The trains had been running close together and the flagman of the foremost did not go back very far. The weather was very cold and the steam from the locomotive interfered with the engineman's view.

22d, on Buffalo, Rochester & Pittsburgh, near Carman Interchange, Pa., an engine and caboose which had been detained by the stoppage of a preceding train was run into at the rear by a following freight train. The empty engine was pushed forward into the train ahead of it, and parts of all three trains were wrecked. The caboose of the foremost one took fire and a good deal of the wreck was burned up. One brakeman was burned to death and 3 other trainmen were injured.

29th, on Buffalo, Rochester & Pittsburgh, near Bradford, Pa., a freight train which was stalled on a trestle was run into at the rear by a following freight and one engine and 34 cars were wrecked, many of the cars falling to the ravine below. The conductor was killed.

29th, on Great Northern, near Brainerd, Minn.; a freight train ran into the rear of a preceding passenger train, wrecking the rear passenger car. Several passengers were injured.

31st, on Indiana, Illinois & Iowa, at North Judson, Ind., a freight train ran into the rear of a preceding freight, wrecking several cars. Conductor killed and two other trainmen injured.

And 14 others on 14 roads, involving 4 passenger and 19 freight and other trains.

BUTTING.

1st, 4 a. m., on Cleveland, Cincinnati, Chicago & St. Louis, at Yorktown, Ind., butting collision of freight trains, making a very bad wreck and blocking the road all day. One engineman and one fireman were killed and two other trainmen injured.

2d, on Ohio Southern, near Bainbridge, O., butting collision of freight trains, wrecking the engines and 4 cars. One firemen was killed and 4 other trainmen were injured.

3d, 12:08 a. m., on Philadelphia & Reading, near Wingohocking, Pa., butting collision of passenger trains, injuring 4 passengers. There was a blinding snowstorm at the time.

4th, 7 p. m., on Southern Pacific, near Livermore, Cal., butting collision between a passenger train and a work train in the Altamont tunnel, badly damaging both engines. The passenger fireman and a tramp were killed and the engineer was fatally burned, being pinned against the boiler for five hours. The collision was due to conflicting orders sent by the train dispatcher.

5th, on Southern Railway, at Summit, Tenn., butting collision between a passenger train and a freight, badly damaging both engines and several cars. Three trainmen were injured. It is said that the freight was running on the time of the passenger train without leave.

7th, on Wheeling & Lake Erie, near Smithville, O., butting collision of freight trains, wrecking both engines and 17 cars. The fireman was slowly burned to death and a man riding in the caboose was killed; and two trainmen were injured.

30th, on Alabama Great Southern, near Hull, Ala., butting collision of freight trains, both running at high speed. Both engines and 23 cars were wrecked. One fireman was injured.

And 5 others on 5 roads, involving 9 freight trains.

CROSSING AND MISCELLANEOUS.

9th, midnight, at Lodi, O., a passenger train of the Baltimore & Ohio ran into a freight of the Wheeling & Lake Erie at the crossing of the two roads, demolishing several freight cars. It is said that the signals were right for the freight.

11th, 7 a. m., on Hannibal & St. Joseph, at Kansas City, Mo., a passenger train of the Wabash road collided with a yard engine which was running into a side track, but had not quite cleared the main track. The tender of the yard engine was overturned, but the engine itself, being deserted and the throttle being jarred open, ran to the Union depot at high speed, where it collided with a string of freight cars, damaging 16 of them. The engineer of the yard engine was killed and the fireman badly injured.

12th, on Chicago, Milwaukee & St. Paul, at Milwaukee, Wis., collision between a passenger and a freight train, wrecking several cars. One trainmen was injured.

13th, 3 a. m., on Indiana, Decatur & Western, at Milligan, Ind., collision between a passenger train and a freight train, killing the passenger engineer.

14th, at Mattoon, Ill., a freight train of the Illinois Central ran into a passenger train of the Peoria, Decatur & Evansville at the crossing of the two roads. A mail clerk was injured.

21st, on New York and Brooklyn Bridge Railroad, at the New York terminus, a switching engine ran into a passenger train.

About the same time a similar collision occurred at the Brooklyn end, injuring 3 passengers. There was a dense fog at the time.

23d, 11 p. m., at London, O., a passenger train of the Pittsburgh, Cincinnati, Chicago & St. Louis ran into a freight train of the Cleveland, Cincinnati, Chicago & St. Louis, at the crossing of the two roads, overturning the engine of the latter train and wrecking 4 freight cars. One engineman was injured.

And 14 others on 12 roads, involving 6 passenger and 20 freight and other trains.

DERAILMENTS.

DEFECTS OF ROAD.

5th, on Fall Brook road, near Middlebury, Pa., a freight train was derailed by a broken rail and the engine fell into the ditch; 11 cars were wrecked. The engineman was fatally injured, being pinned down by the firebox. The thermometer at the time indicated 20 degrees below zero.

12th, on Buffalo & Susquehanna, at Sanders, Pa., a passenger train was derailed by spreading of rails and 3 passenger cars were overturned. There were 37 passen-

gers on the train, but only 2 persons were injured; one of these was the conductor.

18th, on Lehigh Valley, at Audenried, Pa., the tender and several cars of a freight train fell into a deep hole which had been made by the sinking of the earth in a coal mine beneath the track. The engine broke away from the tender and got across the chasm in safety.

And 7 others on 6 roads, involving 2 passenger and 5 freight and other trains.

DEFECTS OF EQUIPMENT.

None causing personal injury; of others there were 10, on 7 roads, involving 2 passenger and 9 freight and other trains.

NEGLIGENCE OF OPERATING.

1st, on Northern Pacific, near Olequa, Wash., a gravel train ran over a hand car and the engine was ditched. The fireman was killed and 6 other trainmen injured.

8th, on Cincinnati, New Orleans & Texas Pacific, near Attalla, Ala., a passenger train was derailed by a misplaced switch and the engine was overturned. The fireman and a tramp were killed and the engineer injured.

10th, on Kings County Elevated, at Liberty avenue, Brooklyn, N. Y., an empty passenger train, being switched at the terminus, was run down a descending grade at too high speed and the engine and one car broke through the posts at the end of the track and fell to the street below. The fireman was killed and the engineman injured.

14th, on Atchison, Topeka & Santa Fe, at Nolan, N. M., a freight train was derailed at a misplaced switch and several cars wrecked. The engineer and fireman were badly injured, the latter fatally.

15th, 11 p. m., on New York & New England, at Boston, Mass., a switching freight train ran into an open draw and the engine and three freight cars fell into Fort Point Channel. The engineer was drowned. It is said that the signals were properly set at danger.

And 3 others on 3 roads, involving 1 passenger train and 2 freight trains.

UNFORSEEN OBSTRUCTIONS.

12th, on Pittsburg, Cincinnati, Chicago & St. Louis, at West Pullman, Ill., a freight train was derailed by snow packed in a switch, and several cars were wrecked. The fireman was injured.

16th, on Southern Pacific, at White Plains, Nev., a passenger train running at full speed was derailed, and the engine and first four cars were wrecked. A brakeman was killed and the engineer and fireman injured. It is said that the derailment was caused by a switch rail out of place, the displacement being caused by a casting which had been placed under it. It is thought that this was done maliciously.

22d, on Pittsburgh & Lake Erie, near Duchesne Run, Pa., a freight train, with the engine at the rear end, was derailed by a rock which had fallen upon the track, and 5 cars fell into the Youghiogheny River. Two brakemen were drowned.

23d, on Southern Railway, near Ayersville, Ga., the engine of a freight train ran into a landslide and was wrecked, together with 3 cars. The fireman was hurt.

25th, on Southern Railway, near Itta Bena, Miss., a passenger train was derailed, at a point where a rail had been maliciously misplaced, and the engineer, fireman and baggageman were injured, the fireman fatally.

26th, 10 p. m., on Denver, Leadville & Gunnison, near Como, Col., the engine of a freight-train was derailed by ice upon the track and the fireman was injured.

26th, 2 a. m., on Southern Railway, near Salisbury, N. C., a freight-train was derailed by a rock which had fallen upon the track and the engine and five cars were badly damaged. The fireman was killed and the engineman and one brakeman injured.

And 4 others on 4 roads, involving 1 passenger-train and 3 freight trains.

UNEXPLAINED.

7th, on Fort Worth & Denver, near Chillicothe, Tex., a freight train was derailed and 2 brakemen and a tramp injured.

12th, on Fall Brook Railway, at Middlebury, Pa., a freight train was derailed and the engine and 11 cars were wrecked. The engine was overturned and the engineman was pinned to the ground; he was badly scalded, and at the same time other parts of his body were frozen, the weather being extremely cold. He died the same day.

21st, on Cincinnati, Hamilton & Dayton, at College Hill Junction, O., a freight train was derailed and 12 cars were wrecked. There was a pushing engine at the rear of the train, which was not stopped for some seconds after the derailment, thus making the wreck worse than it otherwise would have been.

24th, on New York, New Haven & Hartford, at Yarmouth Junction, Mass., a passenger train was derailed on a sharp curve and one passenger car was overturned. Four passengers were injured.

28th, 4 p. m., on Philadelphia, Reading & New England, near Winsted, Conn., a freight train was derailed on a curve and 13 cars were wrecked. Six trainmen were injured.

28th, on St. Louis, Vandalia & Terre Haute, at Coatsville, Ind., passenger train No. 2 running at full speed, was derailed on a curve by a broken switch rail, and the 5 rear cars fell down a bank. The dining car caught fire, but the flames were soon put out. Two passengers were killed and 26 passengers and 1 trainman were injured.

29th, on Louisville & Nashville, near Sparta, Ala., a freight train was derailed at a switch and several cars ran along the side track, striking a freight train standing there. Two trainmen were injured.

31st, on Georgia, Carolina & Northern, near Abbeville, S. C., a freight train was derailed and 6 cars wrecked. The fireman was injured.

And 20 others on 16 roads, involving 1 passenger train and 20 freight and other trains.

OTHER ACCIDENTS.

3d, on Southern California, at Passadena, Cal., the engine and 5 cars of a passenger train were badly damaged by running against a freight engine which was on a side track but did not clear the main line. All the passenger cars but one were torn open.

11th, on Union Pacific, near Lexington, Neb., a tourist sleeping car in a passenger train took fire from the heater or cook stove and was quickly burned up, the 7 passengers having none too much time to escape.

18th, on Rio Grande Southern, at Telluride, Col., a locomotive was badly damaged by a snow slide. The cab was wrecked and the engineman injured.

30th, on Kansas City, Fort Scott & Memphis, near Olathe, Kan., a car in a freight train caught fire and was badly burned. On opening the doors the dead bodies of two tramps were found inside. It is supposed that they were suffocated.

And 3 others on 3 roads, involving 2 passenger trains and 1 freight.

A summary will be found in another column.

Milling, Planing and Drilling Machine Vise.

The accompanying cuts represent a vise for use on a planer, shaper, milling machine or drill press, put on the market by the Massey Vise Company, 35-37 South Canal street, Chicago. The part *A* in Fig. 1 is a loose jaw, and part *B* a grip plate. The jaw *A* is free to slide backward and forward on the longitudinal slot in the vise, as is also the grip plate when tilted slightly forward, thereby disengaging the two teeth from those on the body of the vise. Fig. 2 represents a section of a part of the vise, showing that the rear faces of the steel jaw plates *C C* are inclined, thus causing them, it is explained, when an article is gripped in the vise, to slide downward for a short distance, carrying withthem the article held, the pinholes in the jaw being slotted to allow this motion. It is pointed out that the jaw plates are raised again when the article held is released, by springs working in the recesses *D D*, as shown at the bottom of eachplate. The small cap screws are designed to prevent water and dirt entering the pinholes. In Fig. 3 the appearance of the parts is shown when in position to hold a piece of taper work. In operation the work is placed between the jaws, the loose jaw and grip plate are slid up to it, and the screw in the grip plate is tightened against the loose jaw. The manufacturers say that the work will then be tightly held, and that at the same time it will be pressed down firmly and uniformly upon the surface of the vise, obviating the necessity of hammering the work down. The makers claim that the vise embodies three features—quick and firm chucking, swivel jaw and the pressing of the work down on the bed plate by the inclined shape of the jaws. The vise is made in three sizes, 3-in., 4-in. and 5-in., face to open 6¾, 8¾ and 10¾ in.; and can be used on a milling or planing machine and drill press.

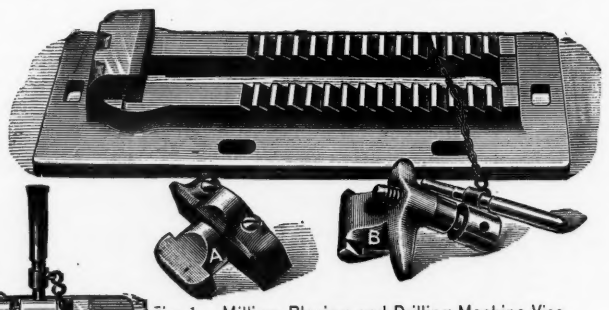


Fig. 1.—Milling, Planing and Drilling Machine Vise.

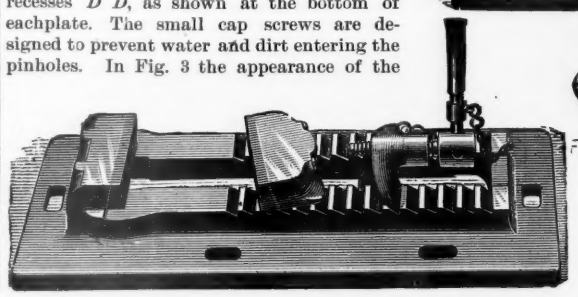


Fig. 3.—Position of Parts when Holding Taper Work.

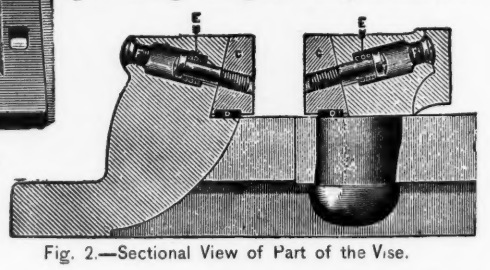


Fig. 2.—Sectional View of Part of the Vise.

Besides chucking regular work it saves the cost of making many special pigs.

The New Kalamazoo Hand-Car Wheel.

This wheel has been pretty thoroughly tested during the past year, having been adopted as a standard by one of the largest railroad systems in the country, upon which several hundred of them are in use.

The wheel has a steel tire and a malleable center. The tire is made without a weld from a solid steel washer spun into shape, and is shrunk on the center, and the wheel is made up without a bolt or rivet. The malleable iron center possesses the great advantage of having its hub and spokes cast in one piece, thus dispensing with the separate hub either bolted or riveted to the center in built-up wheels. It also has the additional strength of the two internal flanges at the rim of the wheel. Furthermore it may be re-tired. These centers are turned to fit any standard (20-in.) hand car tire, and railroad companies having old tires can purchase these centres for repairs. The Kalamazoo Railroad Velocipede & Car Co., of Kalamazoo, Mich., the makers of this wheel, will sell the wheels complete, or the centres alone, and all of their hand and push cars will be furnished with these new wheels in the future.

The New Kalamazoo Hand-Car Wheel.

A German Discussion of the Economics of Construction.

In the volume for 1892 of the *Archiv für Eisenbahnwesen* is an interesting criticism of a theoretical discussion made by Herr Geheimrath Launhardt in his "Theorie des Trassirens" concerning the sum which can be safely spent in roadbed and equipment under a public and a private management. Launhardt's conclusion is, that it is not economical for a private corporation to invest as much fixed capital in a perfect roadway as could be safely invested by the State as an owner of the roadbed. The following is a translation of the review of the theory as made in the above-mentioned volume of the *Archiv:*

"The construction cost of a road maintains a certain changing relation to the cost of operating. If it is desired to unite two places which are separated by a level basin by a railroad, it can be built cheapest when the road is made to follow the surface formation. Later, however, every train has to overcome the bad grades, with corresponding increase in operating expenses. If an embankment is thrown across the basin, and the track is made horizontal, the construction cost will increase while the cost of operating will diminish. Launhardt calculates the most favorable amount of construction capital, and comes to the conclusion that a private railroad will be differently constructed than a road managed on the basis of public economy, and that the most favorable public economy aspect never comes into consideration on the side of a private road. He assumes that the most favorable construction cost for a determined stretch of road built on a general economic basis is 126,500 marks per kilometer, in a country where five per cent. is the customary interest, and which has a traffic of 800,000 tons and a rate of .04 marks per kilometer, while the operating expenses would be .0229 marks per ton-kilometer. On the other hand, it may only require 80,000 marks per kilometer for a road under private control to suit similar traffic, and the operating expenses rise to .0275 marks per kilometer. The private corporation earns yearly, in this case, 800,000 (.04 — .0275) = 10,000 marks, or 12.5 per cent. on the construction capital. The road built on the basis of public economy, on the contrary, earns 800,000 (.04 — .0229) = 13,680 marks, in this case only 10.8 per cent. of the construction capital."

This on first glance appears plausible, and as an argument in favor of a cheap roadbed and equipment. As the reviewer shows in the following paragraph, thisarises from the assumption that all the capital is represented by bonded debt, and none of it is share capital:

"As is well known, a private road rarely builds wholly with its own capital. All issue bonds. If it now arises to a private corporation to choose whether it will raise a loan of 80,000 marks per kilometer, and earn thereby 10,000 marks, or whether it will raise 126,500 marks per kilometer, and so earn 13,680 marks, it will, under normal conditions, manifestly determine upon the higher sum. For, in the first case, the net earnings of the road, after deduction of necessary interest on bonds, will be (10,000 — 4,000) = 6,000 marks; while in the last case the net profits would be (13,680 — 6,325) = 7,355 marks. In short, a private company, in seeking its own interest, will build exactly the same as a road to be constructed on greatest public service principle."

Brandt's Rock Drills.

English engineers, whether engaged in mining or tunnel construction, generally consider the percussive preferable to the rotary system for drilling in hard rock, and usually adopt compressed air as their motive power. It will, therefore, perhaps surprise many of the readers of *The Engineer* to see in the Simplon Tunnel Report that Messrs. Brandt & Brandau, who have taken the contract for this great work, and who have already had considerable experience in tunnel making, have decided that they can pierce the rock which they expect to meet, more quickly, as well as more cheaply, with rotary drills than with percussive; and that they consider that hydraulic power will be more advantageous than compressed air.

Drills on the same principle were used by this firm on the west side of the Arlberg Tunnel in 1883. In this the

average daily rate of progress was 18 ft. 4⅛ in. In 1887-88 they drove two tunnels by means of these drills, one at Mansfeld, in Germany, and the other at Suram, in the Caucasus, the former being four miles long, the latter about two and a half. In both tunnels the average daily rate of progress was 19 ft. 8 in., though in the latter the average was considerably greater as it approached completion, and in June, 1888, it was 25 ft. 5 in., the rock being limestone and conglomerate. With the experience gained in these two contracts, Mr. A. Brandt has made several modifications of the drill, and Messrs. Brandt & Brandau expect when the Simplon Tunnel Works are in full swing, that the rate of progress will be even greater than anything they have yet attained.

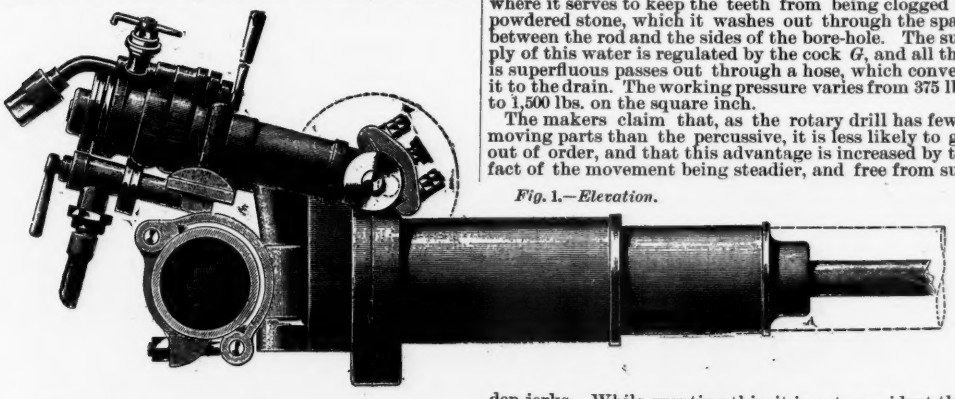


Fig. 1.—Elevation.

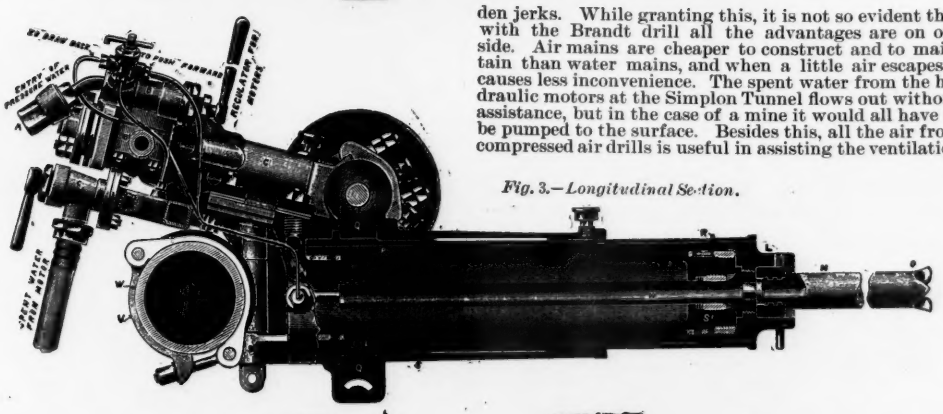


Fig. 3.—Longitudinal Section.

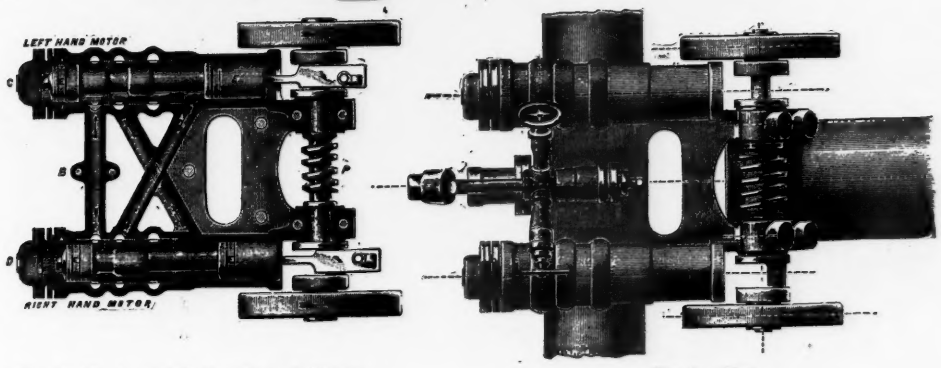


Fig. 4.—Horizontal Section through Motors. *Fig. 2.—Plan.*

Brandt's Hydraulic Rock Drills at the Simplon Tunnel.

Messrs. SULZER BROTHERS, *Winterthur, Engineers.*

In the illustrations, Fig. 1 shows an elevation of the type which has been definitely adopted for the Simplon Tunnel excavation, and which was tried last year in the presence of the consulting engineers, at the works of the makers, Messrs. Sulzer Brothers, of Winterthur. Fig. 2 is a plan of the same; Fig. 3 a longitudinal section through the drill cylinder, showing one of the hydraulic motors in elevation; Fig. 4 a horizontal section through the motors, and Fig. 5 two drills at work.

In Figs. 3 and 4, the post or column on which the drills are carried is shown at *W*. They can slide along this or be turned to any angle, and are then fixed in position by the clamp *V*. The fixed plunger *S* stands on *S*, which is the base of the machine. On this plunger slides the cylinder *L*, which through the rod *N* presses the drill *O* against the rock which is being bored. Twin hydraulic motors *C* and *D*, working up to 25 H. P., are fixed by screws to the base *S*. The pistons of these motors *E* drive two cranks, set at right angles to one another, which turn the same shaft, on which there is the worm *P*. This turns the worm-wheel *Q*, which rotates the cylinder *R*; and *R* is connected by grooves and feathers with the pressure cylinder *L*, so that by its means a rotary motion is given to the rod *N* and the drill *O*, which makes from six to ten revolutions per minute.

The cylinder *L*, and consequently the drill, can be moved forward 2 ft. 2¼ in., until it assumes the position shown by dotted lines in Figs. 1 and 2. It is the nmoved back, and *N*, which consists of a series of pieces, connected by very quick-running screws, is lengthened. These pieces, as well as the drills, are made of drill steel 2⅝ in. diameter, with a ⅞ in. hole running through the center, to allow water to pass to the end of the drill. This is widened out to 2¾ in. diameter, and has three well-hardened saw-shaped teeth. When blunted, the drills are partly ground and partly milled. The column *W*, which serves as support for one or more drilling machines, consists of a cylindrical tube, which by hydraulic pressure is very firmly fixed between the sides of the heading. With this object there is a differential plunger with a piston at the open end of the tube. By means of a two-way cock the pressure-water can be made to force the plunger either in or out, so that the column can be securely fixed or loosened immediately.

To work the machine, the column is first secured in position, the drills are then placed as may be desired, being turned by means of the uni ersal joint in their base, and they are then clamped to the column by *V*. The movable end of the pressure main is then connected to *A*, and the motors started by means of the valve *B*. By partially closing this valve, the speed of the motors may be regulated as desired. On the top is a two-way cock for moving the pressure cylinder *L*, and consequently the drill, backward and forward, and there is also a regulator valve for regulating the pressure of the water from the main, so that the pressure on the drill may be increased or diminished according to the hardness of the rock. When this has been set, the advance of the drill is automatic.

The water which has served to drive the motors can still be used to wash out the bore-hole,as it can be passed through the tube *H* into the hollow rod and the drill, where it serves to keep the teeth from being clogged by powdered stone, which it washes out through the space between the rod and the sides of the bore-hole. The supply of this water is regulated by the cock *G*, and all that is superfluous passes out through a hose, which conveys it to the drain. The working pressure varies from 375 lbs. to 1,500 lbs. on the square inch.

The makers claim that, as the rotary drill has fewer moving parts than the percussive, it is less likely to get out of order, and that this advantage is increased by the fact of the movement being steadier, and free from sudden jerks. While granting this, it is not so evident that with the Brandt drill all the advantages are on one side. Air mains are cheaper to construct and to maintain than water mains, and when a little air escapes it causes less inconvenience. The spent water from the hydraulic motors at the Simplon Tunnel flows out without assistance, but in the case of a mine it would all have to be pumped to the surface. Besides this, all the air from compressed air drills is useful in assisting the ventilation of the mine or heading; but when hydraulic motors are used the corresponding quantity of air has to be supplied by fans. At Simplon the supply of water is almost unlimited, and that is probably the reason why the consulting engineers have agreed with the contractors that the system they propose is the most suitable.—*The Engineer.*

Thoughts on Railroad Possibilities in 1830.

The engineers of half a century ago invariably underestimated the cost of the railroads which they located. The difference between estimated and final cost was often 50 per cent. Not only were their estimates unreliable in the matter of roadbed, but they were never able to appreciate the increased volume of traffic that would be induced by improved transportation facilities. The public went further astray than the engineers. The hopes of those who advocated the system were unbounded and contrasted strangely with the unlimited pessimism of those who opposed it.

In a volume of some 240 pages devoted to the study of the political economy of railroads, and dated 1830, an interesting presentation is made of the hopes of the public with regard to the possibilities of the new system of transportation. At first it was supposed that horses would draw the wagons on the railroad, and that the main problem for the engineer was to reduce to a minimum the resistance of friction between the rails and the wheels. The writer stated in all seriousness, "that it is not impossible that a horse will ultimately draw, not 20, but 50, or even 100 or 200 tons, and perhaps when the resistance of the surface of the rail is reduced even horse power may become disused, and wagons be ultimately propelled by cranks and the human hand."

The writer continues in the same strain with reference to the power of the locomotive and the transformations it was expected to produce in the agricultural and industrial systems. The following extracts indicate to some extent the extravagance of public hope in this matter:

"Extensive manufacture of new soils will arise, the science of chemical agriculture will become of the most extensive benefit to nations, and land may be rendered of equal fertility all over the world. Soils now useless will be cured of their sterility when the requisite material for combination can be purchased at a distance, and can be conveyed at a cost of probably half a cent for 10 tons per mile.

Then the mountains will be levelled, for the value of the soils, stones and ores and other materials of which they are composed, and for the acquisition of the land now covered by their bases, which can then be coverd with the fertile soil. Improvement of climate will then rapidly follow the removal of ranges from high latitudes. . . . Bogs, locks and estuaries will be drained and converted into land by the diminished expense of such undertakings, and the surface of the British islands be even doubled in extent. . . . The mind indeed becomes lost in the attempt to follow after the immeasurable results which this annihilation of time and space will produce upon the destinies of mankind."

The hopes concerning the vastness of the revolution to be accomplished by the introduction of the iron ways goes far ahead of anything which has been attained. The price of railroad transportation was expected to be so low that it would be more profitable to unload imports at the sea-coast and send them up to London by rail. And, as the little book goes on to say: "Not alone the Thames, but the Mississippi and the St. Lawrence will be deserted, and all traffic will go by rail." The docks along the banks of the Thames were to be drained and "would not be wholly useless, since their bottoms would be very fertile from the sediment of a century, and could be profitably employed as arable land."

R. D.

For the Convenience of Sleeping-Car Passengers.

On the Vanderbilt roads the regulations by which conductors of through trains arrange to collect their tickets from passengers in sleeping cars without causing them unnecessary inconvenience and without disturbing them while they are in their berths, have lately been extended, and are now so perfect that a passenger can go through from Boston to Chicago or Cincinnati on any one of the three or four principal trains without having more than one interview with the conductor. The identification slip, which is given to the passenger by the first conductor (who takes up the ticket), is made of bright pink paper, so that it is easily seen, and the stub of this slip, pasted to the back of the contract portion of the ticket also makes a conspicuous mark. For annual or time passes, of which a through passenger may have to show two or three, the conductor uses a special envelope for each passenger, and the pink slip is pasted to this envelope instead of to the pass. Where a passenger pays his fare to a point short of his sleeping-car destination the conductor fills out a special card for the information of the next conductor. Besides this, the envelope, in which each conductor delivers the tickets for a car to the next conductor, has upon its facet room for remarks concerning any irregularities. The regulations provide that a passenger may at any time get his ticket back by applying for it, and as a further provision for people who are likely to become uneasy, the portion of the ticket beyond the sleeping car route is never taken up. For instance, a passenger holding a ticket from Albany to New Orleans via Cincinnati hands his ticket to the first conductor after leaving Albany, who takes up only the coupons as far as Cincinnati, pasting the stub of his pink slip to the back of the last coupon of the portion taken up.

The arrangements between the Boston & Albany, the New York Central, the Michigan Central, the Lake Shore and the Big Four were made by the officers of the ticket departments of the respective roads, and the foregoing information was given to us by Mr. W. F. Parsons, of the Michigan Central. It will be seen that the principal necessity for a formal agreement between the different roads is to so adjust the details that the acceptance of a ticket by, for instance, a conductor of the Boston & Albany, on account of the Michigan Central, will be recognized as valid by the officers of the latter road, for the Boston & Albany conductor, in taking up a Michigan Central coupon, really acts as agent for the Michigan Central.

The Lake Street Elevated Railroad Extension, Chicago.

During the fall and early winter of 1894, the foundations of the superstructure for the extension of the Lake Street Elevated Railroad in Chicago were put in, but the work was stopped by an injunction. This extension from Market Street East on Lake street to Wabash avenue forms a part of the proposed loop, but is the only portion where the consent of property owners has been gained. Several weeks ago the injunction was dissolved, but the weather was so cold that nothing was done until about the 9th of February, when fires were built on the ground covering the foundations to thaw out the frost. Since then the work has been progressing. On February 16 the superstructure was completed up to Franklin street and it is expected that the whole of the extension will be finished shortly. This extension will be for seven blocks, the terminus being at Wabash avenue, whence it is hoped to carry it on south to Congress street to connect with the Alley Elevated. The work is being done by the Phœnix Bridge Company, and the superstructure is lighter in design than that of the main line west of the river, lattice girders being used instead of box girders as heretofore. The columns are placed so as just to clear the street car tracks, leaving space enough for wagons to pass on the outside.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

In our issue of Jan. 25 we gave figures of the gross earnings of the railroads of the United States, being returns from 125 roads. The *Financial Chronicle* has now compiled the figures of gross and net earnings for 206 roads, covering 134,777 miles. The loss as compared with 1893 is about 123 million dollars, or 11.26 per cent. in gross, and in net the loss is about 40¼ millions, or 12.14 per cent. In the preceding year the loss in gross was 1.68 per cent., and in net 3.38. These figures should be compared with the *gains* of former years. In 1892 the gain in gross, on 210 roads, was 56½ millions; in 1891, on 219 roads, it was 47 millions, and in 1890, on 206 roads, it was 72 millions. In 1892, there was a loss of 7.7 millions in net, and in 1891 there was a gain in net of 22½ millions. It will be observed by comparing the decreases in gross and net of the year just past that there was a decrease in expenses of about 83 million dollars, which sum represents the reduced payment for wages and supplies, leaving 40¼ millions as the loss to be borne by the owners, who will, however, eventually have to make good some part, probably a considerable part, of the saving in expenses. The record by months for the year 1894 shows losses in gross and net in every month but August, when there was a slight gain. In January the falling off was 13.08 per cent., which became 19.51 in May. It was 19.43 in June, and gradually diminished to 3.95 in December. In net the loss in January was 8.87; in May it was 33.79 per cent., and in December is was 1 6. In amount of loss in gross the Pennsylvania system leads with the sum of $12,794,000; the Atchison lost $7,966,000; the Burlington, $6,842,000; the Reading, $6,084,000; the Lackawanna, $5,732,000; the St. Paul, $5,387,000; the New York Central, $4,913,000, and the Erie, the Northwestern, the Union Pacific and the Lake Shore each lost a good deal over $4,000,000. The loss of the Illinois Central was $3,696,000. In net earnings the Atchison was the heaviest loser, its loss having been $5,707,000. The Union Pacific lost $3,477,000; the Erie, $2,572,000; the Northwestern, $2,491,000; the Pennsylvania, $2,445,000; the Illinois Central, $2,312,000. The Lake Shore with, a loss of $4,161,000 in gross, loses but $195,454 in net. The New York Central, which lost $4,913,000 in gross, loses $704,562 in net. On the Burlington and the St. Paul, also, the losses in net earnings have been rather small in proportion to those in gross. Only in New England do the roads show actual gains in net, notwithstanding decreases in gross. By percentages the granger roads show the heaviest loss in gross and the Southwestern the heaviest loss in net. The smallest percentage of loss in gross earnings is shown on the Southern roads, where it was only 2.7 per cent., and there the loss in net was ½ of 1 per cent.

In the annual report of the Chicago & Alton Railroad recently issued, the president, Mr. Blackstone, gives some remarkable figures as to the burden of taxation borne by the railroads of the country. In 1874 the taxes of his company amounted to 10 per cent. of those earnings applicable to dividends; in 1894 they had risen to 15.75 per cent. This, however, did not include the income tax which must be paid on the income of that year, and which will raise the taxes to 18.42 per cent. of all available revenue, or 21.76 per cent. of available revenue drawn from the traffic of the road. Looking further to all the railroads of the country, "no comparison can be made between the amount of taxes and earnings available for dividends on about three-fourths of the railroad properties, because they have no such earnings." In the year ending June 30, 1893, the owners of railroad stocks to the amount of more than 2,859 million dollars, or 61.24 per cent., of all such stock received no dividends; and the owners of more than 492 millions of bonds, or 10.93 per cent. of all the railroad bonds, received no interest; but taxes amounting to more than 36½ million dollars were paid by the railroad companies, which is equal to an assessment of 36.18 per cent. on the amount of all the dividends paid to railroad shareholders in that year Mr. Blackstone estimates that in 1894, including the income tax, the amount of taxes imposed upon the railroad companies will be equal to at least 50 per cent. of the total amount of all dividends paid in that year; and in closing this topic he says, "Truly our hydra-headed ruler exercises unlimited power over railways and appears insatiable." These are indeed remarkable figures, and this is a very striking way of putting a serious fact. Doubtless some good will come from making it known to the public that the owners of railroad properties bear such a burden of taxation, but it is not likely that any relief will come for a great while. The people who think it is a good joke to make about 80,000 people out of the whole population of the United States pay a heavy special tax are not likely to be moved, except it may be to mirth, by such figures as Mr. Blackstone has brought forward.

Freight Car Standards.

The following resolution which was passed by the American Railway Association last October, and which was recently sent to the members of the Master Car Builders' Association (see *Railroad Gazette* Feb. 15), has produced a more important effect than was anticipated Many small roads that have paid but little attention to the standards are beginning to read the signs of the coming of a standard freight car and are trying to learn the probable type and dimensions. The resolution is:

"That the details of car construction adopted by the Master Car Builders' Association, as published with the Proceedings of its convention held at Saratoga in June, 1894, be and are hereby adopted as standard by the American Railway Association, and all railway companies and car builders are recommended to conform thereto as soon as practicable."

This, together with the recent action of the roads entering Chicago, in making the owners of cars responsible for about all defects that are not caused by wrecks, and the evident approval of this move to an extent that promises that the Master Car Builders will at the next convention adopt such a rule for interchange, has set the roads that have refused to follow the M. C. B. standards to looking about to see how they can get into line as soon as possible.

Everyone knows that the quickest and cheapest repair work is had when cars have the same dimensions and details. As it is now there is an enormous variety of details, which do not differ enough to affect either the strength or the durability. Car builders on small roads have made special designs to suit their own hobbies, which are giving much trouble in repairs. One effect is that the parts that have to be kept in stock at repair points crowd the store houses. The prospect now is that all hands will be forced to bear in mind the duplication of parts when new designs are made, and this step is being taken by the higher officers, as it should be. Some of the more prominent men in this move are those who would not, a few years ago, permit their master car builders to attend the conventions. The experience with the great variety of designs that have been put out for general use during the last five years has shown every practical man that independence of action must have a limit or the delays to freight will increase until a promise to deliver will be largely dependent upon the design of car that is at hand for use. In fact, it is the case now that a car that is of a well-known and standard type is far safer to ship time freight in than one that is unusual in its details.

The first step will be toward a standard truck and a draft attachment. To leave room for improvement it is said that the standards will not be so fixed that new types cannot be used, but they will govern the variations from the common types and prevent small and annoying differences.

In line with this tendency to get standard freight equipment is the action of the Trunk Line and Central Traffic Associations in appointing committees to report on the practicability of establishing limits to the dimensions of freight cars, a matter which we discussed somewhat in our issue of Feb. 1.

With the railroad associations all working in the same direction, something will soon be done to stop the production of cars that make trouble in yards and at repair points, and it is understood that the Master Car Builders' Association will take a step toward a standard car at the next meeting by appointing a committee to make recommendations.

How to Live Without a Pool.

The pooling bill is dead. It will not be safe to regard it as irrevocably buried until the night of March 4, but all the Washington correspondents gave it up last Saturday night when the Senate refused, by a vote of 24 to 42, to set aside the Indian appropriation bill in favor of it. The reasons for this outcome need not be dwelt upon. A large number of Eastern and other conservative senators apparently had agreed to take up the bill and press it to a vote, but it seems to have been very evident on Saturday that the Populists and other members who never favor anything supposed to be in the interest of capitalists would waste two or three days in talking before they would permit the bill to come to a vote, and therefore many of those who favored the bill, feeling that so much time could not be given without running the risk of forcing an extra session of the Fifty-fourth Congress, voted not to take it up. Besides this, the personal animosities of senators seem to have had an influence in the matter.

And so the railroads of the country are left to struggle on for another year under the conditions now prevailing, which are undeniably bad. It is true that there are not so many railroads which live almost wholly on competitive freight now as there were ten years ago, and to this extent pools are not so necessary as they formerly were. The country has grown rapidly during the past ten years, and the principal roads have a larger percentage of local traffic which cannot easily be taken away from them. But, on the other hand, the rates on non-competitive traffic have been everywhere reduced by the long-and-short-haul section of the law, by direct legislation, or by other causes, so that the necessity of maintaining rates wherever possible, and wherever a reduction will not permanently increase profits, is as pressing as ever. And the conditions of competition, where competition exists, are as severe as ever, while the great reduction which has taken place everywhere in the rates for carrying freight has so reduced revenues that the conduct of negotiations between competing lines demands not only the most careful attention and study on the part of the traffic managers interested, but the greatest coolness and discretion as well. A traffic manager cannot agree to an onerous adjustment of competitive rates on the strength of a hope that future changes may make up any loss which he may bring upon himself, for the future has got through favoring us in that way This is an important point to bear in mind in considering the present necessity for pools, for the success of many of the agreements in the past, which (unlike pools) depend entirely upon honor and confidence, has been due to the fact that some broad-minded man would thus temporarily shut his eyes to his own interests for the sake of averting demoralization.

In all quarters rates are now so low that the profits are inadequate, even from the Granger's standard, and the amount of business is so small that the temptation to the weaker roads to cut rates is very severe. Grain is being carried from Chicago to New York openly at 20 cents per 100 lbs., and, according to the assertions of dealers acquainted with prices, at reductions of 5 cents, and even 7 cents, from this figure. Whether these secret cuts are made or not, it is doubtless true that a large share of the grain for the Atlantic seaboard is carried at a rate per mile as low as the lowest here mentioned, the scanty corn crop having tended to throw an increasing proportion of that grain upon routes which do not run through the large cities and on which lower rates have been made to get the freight. The Chesapeake & Ohio has a steamer line from Newport News, and these boats must be filled, practically at any cost. About the same thing is true at Portland, and to some extent at Boston and Baltimore. New York merchants see export grain going through other ports to such an extent that they have appointed a committee to see what can be done about preserving the supremacy of their own. This competition between ports intensifies competition between the railroads. As far as the grain carriers east of Chicago are concerned, the competitive conditions are not likely to improve, for the monster vessels on the lakes can now carry corn and wheat so cheaply (say 1¼ cents per 100 lbs. Chicago to Buffalo) that the amount of grain to be carried to the seaboard by rail is not likely to increase much for a long time to come.

The trunk lines and their western connections are not the only roads which are straining every nerve to

get traffic. The rate war on coal from Southern Indiana and Illinois to Chicago hangs on with a persistency which indicates desperate purposes on both sides. The weak spots in the western pass agreement show that favoritism in freight rates is by no means a thing of the past. The Southern railroads, which have always had their little spats, but which have in past years kept their Association in a reasonable state of serenity, seem to be gaining additional proficiency, year by year, in the practice of reckless rate-cutting methods, formerly supposed to be peculiar to East and West lines.

There is no novel principle connected with the present conditions, and we can see no available remedies except those of which the merits are already well known. The law prohibits pooling; the railroads cannot defy the law. Some very good lawyers stand ready to test the constitutionality of the fifth section in the courts, but, even assuming that they have good grounds for their predictions of success, it is by no means certain that a test of this law would not prove to be a very indiscreet challenge to public sentiment. It is true that the situation has changed since 1887. Then no one dared for a moment to speak of a pool: later the Interstate Commerce Commission was ready to wink at violations of the law, or at least at manœuvers which leaned strongly in that direction; and now we have members of the Commission, if not the whole Board, convinced that pooling probably would not be contrary to public policy. But a large section of the public is still lukewarm.

The condition of public sentiment on the subject of pooling may be seen from the course of events in Congress since the Patterson bill came up for discussion. It is plain that many members decided to favor pooling only as a somewhat doubtful remedy in a somewhat desperate situation. It is equally well known that many members decided in favor of the bill simply because merchants, bankers and railroad men in whom they had confidence desired them to vote for it; the question of principle, being somewhat evenly balanced, hardly entered into the matter as a practical factor. On the other hand, the opponents of pooling in Congress and their constituents (the people who make up the body of the sentiment against pooling) are wedded to an abstract idea, and such a motive, as every one knows, often has more vitality than any amount of economic argument based on practical conditions. The argument that pooling will be a benefit to the public—resting, as it does, on the proposition that stability of rates is more necessary than cheapness—is as hard to state, in a manner to carry conviction, as the mechanical theory explaining why an injector is the most efficient means of putting cold water into a boiler. It has to be hammered a good many times. With the law just where it was in 1887 and public sentiment but little more enlightened, what shall be done?

The situation is not absolutely hopeless. Railroad managers have no new ways in which to check the evil of rate cutting, but there is ample opportunity for improvement in old methods. An agreement to divide passenger traffic is in no way repugnant to the law; such an agreement on a very small scale was mentioned in these columns last week. Other agreements are under consideration in Central Traffic territory. An agreement between the Trunk lines on westbound passenger traffic from New York has been in existence, more or less effective, for several years. While it may not have been the means of greatly changing the profits of any road, on the other hand it may be said that perhaps the strongest possible pool would have done very little better. One of the chief advantages of any arrangement of this kind is that it keeps the statistics before all parties interested, and by keeping the channels of communication open between the offices of competitors tends to prevent the *inception* of the little tricks which are started by sudden and perhaps ill-founded jealousy.

A freight agreement is not so easy to manage, as any agreement which its enemies could convince a court was a pool would be liable to severe condemnation and penalties. Diversion of freight, as lately tried at Chicago, seems not to be successful; and the experience there in the same line four or five years ago was not such as to encourage the hope that any better results will be achieved now. This leaves, as the most hopeful scheme for settling freight disputes, differential rates. A successful instance of the application of this rule was that of the Trunk Line agreement a year ago, by which the westbound differential of the Erie was increased for a time and then restored. Divisions of passengers and changes in rates (orderly instead of disorderly) in freight are still available methods of regulating competition, and they are readily workable where all interested desire to make them so.

The essential lack in the ordinary traffic agreements, either passenger or freight is that generally the parties do not know, as to every signer, whether he means what he says—whether it is himself, or himself and a half dozen tricky traffic officers, that they are dealing with. The reason many roads, which would readily enter a pool and live up to it, will not give any earnest support to rate agreements of the kind now in vogue is that they have more confidence in bonds than in words. The fact that there are some railroad officers whose bond—even a bond unenforceable in the courts and depending for its strength upon its peculiar terms and the publicity of the transaction—is better than their word, is the chief element of insecurity. Whenever managing officers have made an agreement, and have themselves seen to it that their subordinates kept its provisions, there has been marked improvement at once. The fact that this has been done, now and then, when Wall street became desperate, is the reason we say that the situation is not hopeless. The assertion that conditions improve when the officers in supreme command take a personal part in making agreements is verified, we think, by the slowly improving condition of the competitive situation among the Eastern Trunk lines, where the presidents can and do get together oftener than is the case farther West. And the number of well-disposed presidents is large enough, in all the principal competitive fields, to severely punish the reckless rate cutters if only they—the orderly ones—will act together; and there is little doubt that they can act together if they confer often enough.

Annual Reports.

Chicago & Alton.—The Chicago & Alton is a very remarkable railroad in several ways. It has declined to make its annual reports on June 30, and continues to make its fiscal year end with the calendar year, and so reports to Dec. 31. This is a small matter, but is one of those straws which shows how the wind blows; that is, it is an indication of the state of mind of its controlling officers toward the various commissioners. It has declined for years to be lured into the invasion of unprofitable territory, and this is a great matter, and from it flows the other remarkable fact that during the last 30 years the total capitalization of the system has been, occasionally, actually reduced, and the President says that at the end of 1894 the total capitalization, including all obligations of the company, was less than 60 per cent. of the actual cost of the property in its present condition. A dividend of 8 per cent. is therefore equivalent to about 4¾ per cent. on such share capital as would, with the funded debt, represent the actual cost of the property. Last year the capital stock was increased by the sale of 24,502 shares to the shareholders at $114 a share, but the funded debt was decreased about $2,929,000 by cancellation of the first mortgage bonds of the St. Louis, Jacksonville & Chicago Railroad. Thus, leaving out of the account the bonds and stocks of the Louisiana & Missouri River Railroad acquired during the year, the total bonds and capital stock of the company were reduced during the year $523,800. The bonds of the Louisiana & Missouri River Railroad amount to $2,085,000, and that stock on which dividends of 7 per cent. are guaranteed amounts to $329,000; but the President says that by the purchase and assumption of this property a considerable reduction of the annual fixed charges may be expected. Considering all these things, we think that we are justified in saying that this is a remarkable railroad.

The results of operation for the year 1894 were as below:

Gross earnings:	Earnings.	Inc. or Dec.	Inc. or Dec. p. c.
Passengers	$2,043,912	— $856,908	— 29 54
Freight	3,881,545	— 391,573	— 9.16
Express	172,3·9	+ 216	+ 0 1 5
Mails	181,280	— 488	— 0.268
Miscellaneous	13,171	— 25,651	— 66.73
Total	$6,282,237	$1,274,404	— 16 84

Operating expenses:	Expenses.	Dec.	Dec. p. c.
Conducting transportation	$1,531,536	$177,712	10.4
Motive power	1,137,398	298,906	20.81
Maintenance of way	699 3·5	411 062	37 19
Maintenance of cars	260.449	136,521	34 39
Total	$3,628,687	$1,027,202	22 06

In 1894 the percentage of operating expenses was 57.67; in 1893 it was 62.53. The net earnings in 1894 were $2,663,549, the decrease being 8.49 per cent. As the mileage remained the same the same ratio holds in gross and net earnings per mile.

It was natural that the decrease in passenger traffiic should have been greater than in any of the other items, considering that in 1893 the system had heavy earnings from World's Fair traffic; and this was reflected in the rates and journeys. The average distance traveled per passenger last year was about 50 miles, or 22.6 miles less than in 1893. The average rate paid per passenger-mile was 2.073 cents, and in the preceding year it was 1.836 cents. The total passengers carried last year were 1,979,933, a falling off of 9.25 per cent. The passenger-miles were 98,610,298, a falling off of 37.58 per cent. The passenger miles were much less than in any of the three preceding years.

The average ton-mile rate for freight was 0.917 cent and in 1893 it was 0.884 cent. The total tons carried were 2,774,228, a falling off of 11.325 per cent. The ton miles were 423,166,852, a decrease of 12.425 per cent.; and here again the traffic units were less than in any of the three preceding years. The train loads, however, were heavier, showing one of the elements of economy. The average train load in 1894 was 160.58 tons, an increase of 4.26 per cent. over the preceding year.

The smaller cost of conducting transportation and of motive power would naturally flow from the reduced business, but the great reduction in the money spent for maintenance of way which would not be greatly affected by the volume of traffic tells the story of economy. The saving here was over 37 per cent., or upwards of $414,000. The next item of saving was in maintenance of cars, which amounted to 34.79 per cent., or nearly $137,000. These are the figures which are of greatest interest to supply men, and indirectly to the publishers of the newspapers.

Mr. Blackstone's commentaries on the situation are not very long, but they are extremely pointed, and we shall have something to say in another column drawn from his remarks on the subject of taxation.

January Accidents.

Our record of train accidents in January, given in this number, includes 55 collisions, 67 derailments and 7 other accidents, a total of 129 accidents, in which 32 persons were killed, and 100 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:

COLLISIONS:	Rear.	But. ting.	Crossing and other.	Total.
Trains breaking in two	6	0	0	6
Misplaced switch	1	0	0	1
Failure to give or observe signal	6	0	2	8
Mistake in giving or understanding orders	0	4	0	4
Miscellaneous	4	3	9	16
Unexplained	4	5	11	20
Total	21	12	22	55

DERAILMENTS.			
Broken rail	4	Careless running	1
Loose or spread rail	3	Track repairers	1
Defective frog	1	Runaway train	1
Defective joint	1	Open draw	1
Track undermined	1	Landslide	5
Broken wheel	2	Ice or snow	2
Broken axle	5	Malicious obstruction	2
Broken truck	2	Accidental obstruction	2
Broken brakerod	1	Unexplained	28
Misplaced switch	4		67

OTHER ACCIDENTS.	
Cars burned while running	4
Other causes	3
	7
Total number of accidents	129

A general classification shows:

	Collisions.	Derailments.	Other accid's.	Tot'l.	P.c.
Defects of road	0	10	0	10	7
Defects of equipment	6	10	0	16	13
Negligence in operating	29	8	4	41	32
Unforeseen obstructions	0	11	3	14	11
Unexplained	20	28	0	48	37
Total	55	67	7	129	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other ac'dts.	Total.
Passenger	27	14	4	45
Freight and other	75	55	4	134
Total	102	69	8	179

The casualties may be divided as follows:

Killed.	Collisions.	Derailments.	Other ac'dts.	Total.
Employees	11	12	0	23
Passenger	2	2	0	4
Others	2	1	2	5
Total	15	15	2	32
Injured.				
Employees	22	31	1	54
Passengers	14	31	0	45
Others	0	1	0	1
Total	36	63	1	100

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. Killed.	Pass. Injured.	Emp. Killed.	Emp. Injured.
Defects of road	0	1	1	1
Defects of equipment	0	0	0	0
Negligence in operation	2	14	16	31
Unforeseen obstructions and maliciousness	0	0	5	10
Unexplained	2	30	1	12
Total	4	45	23	54

Twenty-three accidents caused the death of one or more persons each, and 19 caused injury but not death, leaving 87 (67 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with January of the previous five years shows:

	1895.	1894.	1893.	1892.	1891.	1890.
Collisions	55	41	104	120	106	76
Derailments	67	69	157	117	93	89
Other accidents	7	6	12	12	12	6
Total accidents	129	116	273	249	211	171
Employees killed	23	16	38	46	38	51
Others killed	9	28	11	15	8	15
Employees injured	54	49	170	111	118	123
Others injured	46	80	159	152	92	101
Passenger trains involved	45	51	105	109	79	67
Average per day:						
Accidents	4 16	3.74	8.81	8.03	6.81	5.52
Killed	1.03	1.42	1 58	1.97	1.48	2.16
Injured	3.23	4.16	10.61	8.48	6.77	7.32
Average per accident:						
Killed	0.248	0.379	0.179	0.245	0.218	0.39
Injured	0.767	1.112	1.205	1.056	0.995	1.329

There is no more dangerous piece of track in the United States, of equal length, than the elevated railroad of New York city; but at the same time it is so carefully operated that the passengers, instead of being less secure, are really safer than on any other line carry-

ing such large numbers of people, over ten billion having ridden over the road without any accident fatal to any one of them while in the cars. In view of this fact, New Yorkers were startled on seeing in the morning papers of Jan. 11 pictures showing the wreck of an engine and a car which had tumbled into the street. But the accident, reported in the record that we publish to-day, proved to be to an empty train, and it was not on the Manhattan Company's lines, which was reassuring. We do not say this because of any feeling that the public can put up with dangerous railroads any better in other cities than it can in New York; but, obviously, it must have seemed to the Manhattan officers, proud of their good record, like a very unkind stroke of fate for the "pictorial press" in its innocence to publish those pictures, which would fit New York as well as Brooklyn, without putting the name of the city in the caption. If the enginemen and firemen in Brooklyn are as carefully selected and as well trained as those in New York there is no special ground for assuming that such an accident is not just as likely to occur in the latter city as the former; though the very density of the traffic on the New York lines—400 trains a day, each way, on a two-track line—tends to keep the men's vigilance up to the highest practicable pitch.

Two passengers were killed in passenger cars in January, and these on one of the best roads. The rail that broke was nearly new. This and the Brooklyn accident, and two or three others in the present record, serve as reminders that railroading has not been freed from its dangers, even if we have greatly lightened the list of fatalities. The number of accidents in January and the number of employees killed, were larger than a year ago, but January, 1894, was one of the very dullest months. The passenger death record for that month was swelled by the bad collision at Hackensack, N. J., but there has been only one accident as bad as that since.

The worst accidents in the present list, besides those already named, were the butting collisions at Livermore, Cal., on the 4th, and at Yorktown, Ind., on the 1st. So far as can be judged from outward appearances, the efficiency of the American despatching system as a preventive of collisions is not appreciably better than it was five years ago, so that each additional collision like these two only gives new emphasis to the need of the block-system everywhere. The suffering of the engineman in such a case as that at Livermore certainly ought to be a sufficient incentive, if the financial argument is not sufficient, to adopt every possible means of safety. The terrors of the engineman's calling, which, though he generally succeeds in shutting his eyes to them, are ever present, are also vividly illustrated in the collision at Smithville, O., on the 7th and the derailment near Middlebury, Pa., on the 5th. At the latter place the sufferer was not only pinned down by the firebox so that his legs were burned, but was also exposed to the cold weather so long that the upper part of his body was at the same time frozen.

We find accounts of a dozen or more electric street car accidents in January. There was a collision in a blinding snowstorm at Indianapolis on the 2d, injuring two persons, and a collision near Wilkesbarre, Pa., on the 26th, in which one person was killed and five injured. Near the same place, two days later, a trolley car was smashed by a locomotive, but the passengers escaped. A car became uncontrollable and dashed down a hill at Rondout, N. Y., on the 6th, another one in Philadelphia on the same day, one in Newark, N. J., on the 9th and one at Pittsburgh, Pa., on the 24th. These four accidents injured eight persons, one of them fatally. The last-mentioned runaway is said to have been due to a broken brake rod. A freight train ran into an electric street car at Toledo on the 4th and a woman was fatally hurt. A similar accident occurred in Chicago on the 15th and another one in Syracuse on the 24th. Locomotives killed two or more persons at each of a half dozen places in January.

Contracts With Workmen.

Assemblyman D. E. Ainsworth has introduced in the New York Legislature a bill on the labor question which deserves a word of notice. It contains several hundred words, and has five sections, but essentially it is nothing but a requirement that corporations must make written contracts with their employees. Its details have not been carefully worked out; we cannot think that a majority of the Legislature will approve it, and its spirit in some parts is absolutely harmful, but it has the merit of aiming at what is probably the most feasible method of meeting the labor problem, the establishment of a contract system; and the additional merit which, though negative, in these days is a great one, of keeping silent on the arbitration fad.

The bill applies to "corporations," not to railroads alone. It requires a written contract with each employee for at least three months. Each contract must state specifically the amount of wages or salary, when, where, and how payable, the kind of service, and when and where to be performed, the number of hours' service to be performed during each 24 hours, and the manner in which such service shall be performed by the employee. Neither party can withdraw except on three months' notice, and a violation of the law constitutes a misdemeanor; and a corporation disobeying the law is liable to a fine of $500 for each offense; this in addition to the punishment of its officers for misdemeanor.

As we have heretofore said, there is no doubt that many railroads could greatly improve the stability of their relations with some of their employees by making contracts with them; but what does this proposed law give us? At the very outset we find an impracticable provision, that making it applicable to every employee. An extra laborer hired in a freight house or on track repairs must be engaged for three months. This is at least ninety times too long. No contract system can be worked for a moment, unless the forces are classified so that a large percentage of the men, those in the lower grades, can be laid off or taken on as the work may demand. Then again, to specify in detail the kind of service, when, where and how it is to be performed, etc., is a refinement which would be worse than useless in a law. In railroad work no service is worth having except willing service, and willingness is a matter which cannot be specified in technical language, as Mr. Ainsworth would attempt to do.

There is a provision excusing an employee when he is sick, and excusing the corporation when it is prevented by violence from carrying on its business, and other well meant clauses. From these features, and from the general tone of the bill, it is clear that the author of it desires to present an equitable solution of the problem now uppermost in this branch of economic discussion. But we are bound to say that practically all the good there is in this bill is contained in the first half dozen lines, "Every corporation shall enter into a written contract," etc. We should like to see the railroads try making contracts with their men; but, of course, no such contract would be worth the time it would take to sign it, unless *both* sides could and would bind themselves; and the inability or unwillingness of the employee to do this effectively is the one obstacle that Mr. Ainsworth and all the rest of us must first deal with. A writer in the New York *Evening Post*, speaking about the street railroad strike in Brooklyn, suggests that each motorman ought to be made to deposit $5. How large a bond of this kind would be necessary to keep a motorman from losing his head whenever his Brotherhood leader set out to distinguish himself in a campaign we do not know, but we should say that the sum named ought to be multiplied at least by 10. For the more important classes of employees on steam railroads we should say that it ought to be multiplied by 20 or 100.

The new Czar, at the first sitting of the Siberian Railroad Commission, after his accession to the throne, declared his purpose to have the road completed, cheaply, but quickly and durably. Small sums have been assigned to pay the cost of removing Cossack soldiers from European Russia to the Amoor Valley (east of Lake Baikal), and for the settlement of 150 Cossack families belonging to the troops now stationed west of Lake Baikal to the vicinity of the Ussuri Railroad, which is the extreme Pacific section, near the Chinese border, the object professed being to defend the road against rails by Chinese robbers, who apparently are more formidable than Chinese soldiers. The Southern section of this Ussuri road, called the South Ussuri Railroad, has just been completed from Vladivostok to Grafskaja, a distance of 250 miles. About 200 miles more will bring this part of the road to the junction of the Ussuri with the Amoor; and the direction is nearly due northeast from Vladivostok; which is as if a road to be built from Washington to San Francisco should extend first from Washington to Boston, and then take its westerly course from Boston. This is a necessity of the situation, however, for a westerly course from any point further south would bring the road into China; and the development of the country on the line, which must be first and probably chiefly in the river valleys, is many times more important than the through traffic is likely to be. On the western division of the Siberian Railroad, the section from Cheljabiak to the River Irtish opposite Omsk, 496 miles, is open for traffic, though a large amount of work remains to be done on the superstructure. On the next section, from the Irtish to the River Obi, about 60 miles of track is laid; on the following section (called section 1 of the Central Siberian Railroad), from Obi to the city of Krasnojarsk, 200 miles of track were to be laid by the beginning of this year. Altogether, a little more than 1,000 miles of track is laid—34 miles more than one-fifth of the whole.

A correspondent of the *Baltimore Sun* learns from Chief Detective Eugene Grannan, of the Baltimore & Ohio, that "it is a fixed policy of his department to relieve the municipal and county authorities as far as possible of the expense attending the detection and prosecution of all criminals on the railroad, including tramps and other persons who unlawfully ride on freight trains. No man employed by me,' said Mr. Grannan, 'has a right to demand one penny for services in such cases outside of his regular monthly salary from the railroad company. I promptly destroy the receipt for every prisoner our men carry to the House of Correction, so that in no possible way can the treasury of any county or city be drawn upon on that account. We cannot, of course, relieve the public of the costs charged up by magistrates, but by far the most expensive part of such criminal prosecutions, including the transportation of prisoners, is not taxed against any city or county.'" Railroads very generally do more than their part toward repressing lawbreakers. This example on the Baltimore & Ohio is not unlike what may be found in many other places. But there is no reason why a railroad should provide detectives at its own expense any more than a merchant or a manufacturer should. It is true that a boy stealing a ride, an old woman stealing coal, or a tramp sand-bagging a brakeman, *seems* to be doing more harm to the railroad company than to the public, but is that the fact? Probably not. The killing of trespassers on the cars or tracks is an annoyance to the railrado company, but to the general—that is, railroads *and* other people—public it is a disgrace. Likewise the tramps; the worst danger to be apprehended from tolerating them on tracks or trains is that they will derail trains and commit other kinds of violence; and this concerns the passengers on the trains and the residents along the line as much as it does the railroad company.

The law makers of New York are still trying hard to beat their new constitution, thus setting a fine example to law breakers. The people of the state voted to incorporate in the constitution the amendment drawn, and fought for, and finally passed through the convention, by the most intelligent and patriotic members of that convention, forbidding officers of the state to ask for, receive or use railroad passes and forbidding railroad companies to offer or honor passes. This looked like a considerable triumph of enlightened public opinion, but the lawmakers themselves apparently do not propose to suffer in pocket, whatever their constituents may wish, and on the 20th they passed to the third reading the Braun-Robertson bill, which authorizes the Secretary of State to issue certificates to state officers and legislators which shall entitle them to ride free on trains and steamboats. What an example of conscienceless rapacity this is! What a notion it gives of the dignity and self-respect of a legislative body! And yet there is no use in debating the matter, for argument is lost on such an assemblage. In the words of the immortal Flanagan, "What are we here for anyway?" We can only hope that, if the bill is passed, the Governor will veto it. It is difficult to believe that the Court of Appeals would sustain such a law, but it would take some time to get a decision from that court.

Newspaper items concerning fast runs are now so numerous that it is not easy to keep track of them. Indeed, many of the runs reported, although excellent performances, are in no way remarkable except from the fact that they have been made by some man, or engine, or road which has not before entered the lists for this kind of renown. One item published the other day, however, concerning a fast run by the Knickerbocker express of the Cleveland, Cincinnati, Chicago & St. Louis on an ascending grade, seemed so creditable that we got the figures confirmed by an officer of the road. It was on Jan. 27, from De Graff, O., to Bellefontaine, where the grade is 37 ft. per mile. The distance is 9.4 miles, and the train, consisting of six cars, weighing 274 tons, was hauled this distance in 10¼ minutes, or at the rate of 55 miles an hour. The engine, No. 198, has cylinders 18½ in. × 24 in., and four drivers 62 in. in diameter. The weight on the driving wheels is 79,700 lbs. The engine was built in Schenectady, and was run on this trip by Mr. Tomblyn.

A writer in the New York *Sun* says that:

"One of the things about English railroads that pleased me was the placing of signs bearing in large plain letters the name of the station, at a considerable distance, 500 ft. or more, from the station building itself where the train stopped: these signs were, perhaps, on the fence by the long station platform. If you looked out as you approached the station you learned beyond doubt its name. It was interesting as information, and if it was the place you wanted to get out at it was comfortable to know this unmistakably. As far as reading the name of a place on a sign is concerned, if the sign is placed only over the door of a station, it can be seen and read, if the train is on the track nearest the station, only by those in the car in front of it."

Just so; and some few American roads have carried out the idea at some stations. If we were to suggest a further improvement, it would be that the signs should stand at an angle of 45 degrees with the line of the road, and as far back as possible, so that passengers would see them without effort. A sign on the fence farthest from the track that you are riding upon is generally the most convenient to read, but generally there is one or more intervening tracks, so that often a freight train cuts off the view. A sign on *your* side, as far off as that, is the desideratum. We may add, however, that the approaches to stations in England are more disfigured by advertisements than ours, and even the well-placed station sign is often eclipsed by the bigger and more attractive announcements of whiskey and soap.

NEW PUBLICATIONS.

Popular Scientific Lectures. By Ernst Mach, Professor of Physics in the University of Prague. Translated by Thomas J. McCormack. Octavo, 318 pages, 44 cuts and diagrams and index. Chicago: The Open Court Publishing Co., 1895. Price $1.

Professor Mach has the gift, rare among German scientific writers, of lucidity and condensation. We had occasion just about a year ago to review Mr. McCormack's translation of Professor Mach's "Science of Mechanics," an admirable book in style and substance—learned, simple and genuine. The volume before us is of another sort, being really, as the title indicates, *popular* scientific lectures. The lectures are not too popular, however; they are thoroughly scientific in precision of thought and statement, and in soundness of learning; but are popularized by that art common among the Frenchmen, and occasionally found among the English and Americans, and which Huxley has and Tyndall possessed to such an extraordinary degree; the art of investing dry and close exposition and reasoning, with such a garment of light as to make it attractive. We question if Professor Mach has the lucidity of Huxley or the imagination of Tyndall, or the powers of reason of either, or their bold

originality. In short, he is not so great a man. But he has humor, learning and wide reading, and adorns his pages with those allusions and excursions which indicate the scholar *and* the gentleman. The first lecture, the Forms of Liquid, begins: "What thinkest thou, dear Euthyphron, that the holy is, and the just and the good? Is the holy holy because the gods love it, or are the gods holy because they love the holy? By such easy questions did the wise Socrates make the market place of Athens unsafe, and relieve presumptious young statesmen of the burden of imaginary knowledge." The very fact that an author commands such a quotation as this, and has the wit and sense to apply it, is a guarantee that he is not going to bore us, even when he talks about the "fundamental concepts of electrostatics."

In the volume there are 12 lectures of various lengths, varying in the degree of scientific solidity. Besides the one mentioned there is one on the Velocity of Light, another entitled, Why has Man Two Eyes; another one on the Principle of the Conservation of Energy; another on the Principle of Comparison in Physics. These are sufficient to give a notion of the variety of the topics treated.

Compound Locomotives in North America. By E. Brueckmann, Engineer of the Saxony Machine Works, Chemnitz. Berlin: A. W. Shade, 1894.

Mr. Brueckmann spent many weeks in the United States in the World's Fair summer, and made a thorough and careful study of many things that he found in this country, not only those which belong to our normal everyday practice, but those which were assembled from other nations for the World's Fair. One result of his studies was the report made by him to the Society of German Engineers which is now reprinted from the Journal of that Society. The reprint is a quarto pamphlet of 95 pages with a number of folding plates. Mr. Brueckmann describes in detail the types of compound locomotives found in this country. His first general classification is 4-cylinder locomotives under which he gives the Vauclain, the Player and the Johnstone. The second classification is 2-cylinder locomotives, under which are found the Murphy (Cook), the Player (Brooks), the Vauclain, the Pitkin (Schenectady), the Wells (Rogers), the Dean, the Colvin (Pittsburgh), the Mellin (Richmond) and the Batchellor (Rhode Island). Not only are the characteristics of the various engines described, but special examples of individual locomotives are given in detail, weights, dimensions and drawings. In many instances also there are records of experience, including indicator cards.

A chapter is given on the history of the compound locomotive in North America and another on locomotives used, constructed or exhibited here, of which the details are patented by others than American engineers. This latter division of the subject includes the Webb compound as used on the Pennsylvania, the Lindner device as applied on the Chicago, Burlington & Quincy and the Pennsylvania; also the London & North Western, the Northern of France, and the compound locomotives of the Royal Prussian State railroads exhibited at Chicago in 1893.

Although this book is published in German it has sufficient diagrams and cuts to make it useful to those who do not read the language. It has by far the best collection of data that we have seen about the designs of compound locomotives constructed within the last three years.

American Society of Railroad Superintendents: 24th meeting.

The proceedings of the last meeting of this society, held in New York, October 15, 1894, have been issued by the Secretary, Mr. C. A. Hammond, of New York City. As usual, the pamphlet is prepared with much care, and there is a tidy batch of advertisements to pay the printing bill. It will be remembered that the meeting reported in this pamplet was one of the best ever held by the society. There was a good paper on signalling by Mr. W. G. Wattson and an interesting discussion on discipline and the management of employees.

The New York State Bureau of Statistics of Labor, of which Mr. Thomas J. Dowling is Commissioner, has issued two thick volumes giving statistics for 11 of the 60 counties in the State, showing the number of persons of various ages employed in various occupations, with their nativity. The report was made a year ago, but evidently has only just been printed. The volumes contain 3,339 pages and weigh about 10 lbs.; but at least 3,000 of these pages might just as well have been left unprinted, for no one will ever read them. The introduction deplores the fact that, for lack of an appropriation, 49 counties had to be omitted; but this should cause no sorrow except to the State printer and the contractor who sells him the paper. A good summary of a dozen pages would have answered all purposes.

Old Railroad Books.—Mr. Edward Baker, of Birmingham, Eng., informs us that he is preparing another catalogue of railroad literature which will be ready by Easter. He intends to bring the catalogue up to date, introducing modern books. The reader will, no doubt, remember our former announcement of Mr. Baker's interesting annotated catalogues of old railroad literature, covering books, maps, pamphlets and documents of various sorts. We learn that various libraries and other collectors in this country have availed themselves of Mr. Baker's lists to complete their collections.

Third Report of the Bureau of Mines, Province of Ontario, Toronto, 1894.

This report is for the year 1893. It is a pamphlet of 205 pages, including an index, and gives a rather discursive review of the mineral resources and possibilities of the Province. The point of most particular interest is with reference to the nickel industry. It appears that, in the year, the furnace product from copper and nickel ores was about 7,500 tons of matte containing 1,431 tons of copper and 1,642 tons of nickel. The value of the nickel product was about $455,000.

TRADE CATALOGUES.

Track Jacks. A. O. Norton, 97 Oliver street, Boston, Mass. 1895.

The makers of the "Sure-Drop" track jack send us an illustrated catalogue containing much information concerning track and other jacks, and their use. The assortment is varied, and covers all grades of work.

The Dayton Railway Crossing Gate, made by the Craig-Reynolds Foundry Co., of Dayton, O., is the subject of a little pamphlet recently issued by the manufacturers. Crossing gates operated by hand-power alone are now so commonplace that one hardly looks for a novelty in this line; but the merits of the apparatus made by this company are here well set forth, and the details of workmanship on which the company bases its claims for superiority are candidly stated. There are half-tone prints from photographs showing crossings in various parts of the country. The pamphlet has an artistic cover.

Railroad Velocipedes, and Hand Cars. The Kalamazoo Railroad Velocipede and Car Company, Kalamazoo, Mich.

This company issues a pamphlet said to be "preliminary to Catalogue No. 10," which will soon be sent out. The pamphlet shows the great variety of well designed velocipedes and hand cars constructed by that company. The new 1894 steel wheel is also shown, as are a steam inspection car, a Kalamazoo pit car and the Kalamazoo, steel, surface cattle-guard.

Asphalt Car-Roofing is described in a pamphlet issued by the A. E. Filley Manufacturing Co., of 39 Cortlandt street, New York City, manufacturers of the Defiance improved asphalt car-roofing and other asphalt products. The use of asphalt for car-roofing is very recent, but it has been employed by this company for general roofing purposes for five years. Where used for car-roofing it has been shown to have many advantages for that purpose. It is unaffected by extreme changes in temperature, and having strength, flexibility and elasticity is an especially durable material for car-roofing. It is water, acid and gas proof, and absolutely prevents leakage when properly applied. The pamphlet gives a good description of the mineral qualities of asphalt and the method of tempering, the company using for this purpose an oxidized material, insoluble in water, but soluble in asphalt, so that it forms a chemical combination. It rejects the use of petroleum residuum for this purpose, as it is not soluble in asphalt and forms only a mixture instead of a chemical combination. The ordinary method of manufacture of asphalt for car-roofing and the various grades made are described. The asphalt is shipped in crated rolls of various weights. In repairing car roofs asphalt can be applied over old tin roofs by the usual workmen and the car need not be sent to the shop. For roofing of railroad buildings, such as station-houses, docks, freight-sheds, coal-breakers, machine shops, water-tanks, etc., the company makes what is called the Defiance asphalt slag roofing, a surface-coating of granulated iron slag being applied over the asphalt. Asphalt paint is made for painting bridgework and other outside ironwork. A roofing cement is also made.

TECHNICAL.

Manufacturing and Business.

The Pittsburgh Reduction Co. is building an addition to its rolling mill plant at New Kensington, putting up a new iron building and a new train of rolls.

A. F. Boettcher, of Rowlands, Pa., contemplates the enlargement of his present facilities for the manufacturing of the Vulcan lubricating compound for iron, brass and metal workers. This lubricant has been on the market for several years, and is used by several large locomotive and boiler shops, iron bridge and rolling mills, spring and axle works, machine shops and brass workers. Among the largest are the Carnegie Steel Co., Lebanon Mfg. Co., and Middletown Car Works.

Capt. J. R. Reed has sold his machine shops and foundry in Elmira, N. Y., to a company composed of H. C. Silsbee, President; W. H. Steiger, Manager, and C. W. Ufford, Secretary. This company will erect a plant in Elmira, the main building of which will be 120 × 145 ft.

The Youngstown (O.) Bridge Co., recently shipped from its works two heavy girders, each girder 74 ft. long, the combined weight being 50,000 lbs. The girders are for the Shaw Electric Crane Co., of Muskegon, Mich.

F. F. Culver, General Manager of the Unadilla Valley Railroad, is in the market for one rock crusher and one steam shovel.

The metal brakebeam of the Sterlingworth Railway Supply Co., of New York City, will be made at the works of the Cambria Iron Co., the Sterlingworth Supply Co. having recently entered into a contract with the Cambria Iron Co., giving the latter the exclusive right to manufacture these brakebeams.

The Central Railrord & Banking Co., of Georgia, after a test of the Sterlingworth steel bolster, has ordered this device for 100 cars.

The Hamilton Bridge Works, of Hamilton, Ont., were sold at auction in that city on Feb. 18, the property being secured by J. B. Tilton at $49,900. The purchaser is understood to represent a syndicate, of which William Hendrie, of Toronto, is the head, which proposes to start the works immediately.

Operations were resumed this week on double turn at the Duquesne Tube Works, Duquesne, Pa., on Feb. 25, after a two months' shut-down.

The Pero Automatic Car Oiler Co., of New York City, with George W. Pero, of Port Richmond; Charles Kipper, of Tompkinsville, and John D. Sheldon, of New Brighton, N. Y., as directors, has been incorporated in New York.

The Locomotive Valve Gear Co. of St. Louis, capital stock $50,000, has been organized by W. J. Lewis, John A. Kellar, and B. F. Clark.

The Metropolitan Fire-Proofing Company, of Trenton, N. J., is applying its system of fire proofing to the floors and ceilings of the Fahys Building, now being erected at 54 Maiden Lane, New York City. This method of fireproof construction was fully described and illustrated in our issue of Jan. 18, 1895.

Mr. George Place, whose office is now at 145 Broadway New York City, has made the complete equipment of shops and factories with tools an important branch of his business. He arranges to supply and install all the machines and tools needed by a shop, no payment being made until all the equipment has been accepted. Mr. Place has long been an extensive dealer in machines and tools and has supplied the machine outfit of some of the largest concerns in this country.

Iron and Steel.

The Edgar Thomson Steel Works were closed down on Feb. 25 in all departments indefinitely. The Carnegie Company has no orders for rails and little prospect of securing orders. The same is true with steel billets, the last order for which was completed this week. The blast furnaces will continue in operation.

The Sterling Steel Co., whose works are located at Demmler, Pa., has commenced the erection of a rolling mill, 60 ft. × 112 ft. The Shiffler Bridge Co., of Pittsburgh, has the contract for the work. The boiler plant will be furnished by R. Munroe & Son, of Pittsburgh. The Frank-Kneeland Machine Co., of the same city, will furnish an 8 × 12 in. mill.

The Scottdale Iron & Steel Co., Ltd., has under course of erection a 22 × 42 cold rolling mill, being built by the A. Garrison Foundry Co., of Pittsburgh, to be connected with or added to the present cold roll train under cover of one of the main buildings.

The bolt and nut department of the Pennsylvania Bolt & Nut Works, of Lebanon, Pa., has been put on double turn. The company has numerous orders for bolts and nuts, and also an order for an iron fence over a mile long. About 400 additional men will be employed.

The Louisville & Nashville will rebuild its freight depot at Decatur, Ala., which was recently burned.

The Carnegie Steel Works at Homestead, Pa., have closed down in a number of departments in the plant. The converting mill, the 10-in., 23-in., 33-in., 36-in. and 40-in. mills are all idle, and about 1,500 men have been affected.

New Stations and Shops.

The new boiler house for the Stanley Rule & Level Co. was designed by the Berlin Iron Bridge Co. The side walls are of brick, the floors of iron, and the roof of iron, covered with the Berlin Company's patent corrugated iron.

The Berlin Iron Bridge Co. has lately completed an addition to the engine-room of the Narragansett Electric-Lighting Co., at Providence, R. I.

The Four Fastest Vessels in the World.

The torpedo boat destroyer "Boxer," recently built for the British Government by the Thorneycrofts, has beaten the records of her three famous sister ships, the "Daring," "Ardent" and "Decoy." Her mean speed, developed during six separate runs, was 29.17 knots, and a total distance of 100.6 miles was covered in three hours, being at the rate of 33.5 miles per hour.

Pintsch Lighting Equipment.

Mr. Julius Pintsch, of Berlin, reports that up to Jan. 1, 1895, there were 64,000 cars equipped with the Pintsch lighting system in Europe, North and South America, India and Australia. Nine thousand cars were equipped with this system during the year 1894, which shows a very important progress.

Rail Renewals on the Brooklyn Bridge.

The New York & Brooklyn Bridge cable road has used 56-lb. rails up to this time, with the exception of a short distance inside the New York terminal station, laid with 70-lb. rails. It has been judged advisable to use 70-lb. rails throughout, and rails of this weight will be laid when the new terminal stations now being built are finished.

The last twelve cars built for the bridge have springs with only about one inch play, as against three inches upon the older cars. This was done to avoid the variation in height of the grip consequent upon variations in load. Such cars are exceedingly hard upon the track and accentuate any irregularities in it. When the grips are put in grip cars the passenger coaches will all have easy springs.

Cork Pavement.

The Cork Pavement Company, Limited, of London (sole agent for United States, F. J. Jenner, Havemeyer Building, New York city), is introducing a composition of pulverized cork and Trinidad bitumen compressed into slabs or bricks of suitable form and thickness for use on railroad platforms and in baggage rooms, as well as for team gangways of ferryboats and street and other pavements. This material was first made in Australia, where it is used in railroad stations at Sydney, Melbourne and elsewhere. Prof. Boverton Redwood, in his analysis of the cork pavement, says "the material is remarkably tough and cohesive, and is sufficiently elastic without being too easily compressed or indented. It affords a remarkably good foothold, is practically non-absorbent, and constitutes a paving material which may be described as noiseless. . . . The valuable qualities possessed by the pavement are largely due to the judicious selection of a bitumen having the requisite physical properties and to the process adopted for the incorporation of the material."

For laying the cork pavement it is necessary to first make a concrete foundation, 6 inches deep, composed of one part of Portland cement and six parts of ballast. This is brought up to a perfectly smooth and even surface, and allowed to stand 48 hours. A mixture of ordinary gas tar and grease is then applied to the surface of the concrete and two hours allowed for drying. The paving blocks are then dipped into a liquid consisting of bitumen and tar pitch, heated, which forms a good binding material, and are laid as close together as possible, so that the pavement forms one sheet. It is claimed for the pavement that bricks laid in this way cannot work loose; in fact, that they cannot be removed without taking up the concrete. This meets the objections of architects to laying pavements of brick or tiles. On ferryboats the cork bricks would be laid on the planks with felt between.

Eighteen hundred square yards of this cork pavement are laid in the cab-stands and cab-entrance at Princess Street Station of the Caledonian Railroad in Edinburgh, Scotland.

As soon as the demand warrants such a course, Mr. Jenner will erect a factory, in order to make the cork bricks in this country.

Modified Interchange Rules at Chicago.

The roads terminating at Chicago have adopted a report of a special committee appointed for the purpose, which is designed to materially simplify the interchange of cars without defect cards. The report provides that, in addition to the defects classified under M. C. B. Rule 8, defects in couplers or drawbars, drawbar springs and pockets, draw lugs and timbers, deadwoods, end sills, longitudinal sills, cracked end and center plates, any part of truck, including brake beams and attachments, center plates and all body castings and bolts, roofs and running board, loose and decayed sheathing, when not rendering car unsafe to run, shall be passed without inspectors' cards, or may be passed and cards subsequently mailed to owners.

The New Holyoke Dam.

The Holyoke Water Power Company, owner of the extensive water privilege at Holyoke, Mass., supplying power to some 25 or 30 large factories, is to build a new dam across the Connecticut River, 132 ft. down stream from the existing structure, and the contract for the work was awarded last Monday to the Fruin-Bambrick Construction Company, and Henry S. Hopkins, both of St. Louis, Mo. There were 27 bidders, from all parts of the country, and it is said that the figures ranged from $500,000 to $700,000. The officers of the company will not give out the price finally agreed upon.

The new dam is to be of stone, 1,020 ft. long and about 30 ft. high. At the base it will be 54.22 ft. wide and at the apex 2 ft. About 34,000 cu. yds. of rubble stone masonry will be needed. The faces of the dam will be of granite, requiring about 13,600 cu. yds. There is no convenient place to cut the granite near the dam, so that the pieces will have to be practically finished at the quarry. The contractor has three years in which to complete the work.

An Exhibition of Inventions at New York.

An exhibition of patents and inventions will be held under the management of the Commercial Exhibition Co. in the Grand Central Palace, Lexington avenue and 43d street, New York City, beginning March 9 and closing about a month later.

Buffalo Grade-Crossing Contracts.

Specifications for the substructure work in connection with the removal of grade crossings in Buffalo have been issued and bids asked for. This part of the work consists of excavation, foundation and other masonry, at Main street and The Terrace, between Main and Washington streets, at Washington street and at Michigan street.

Proposals are to be sent to H. W. Webb, Third Vice-President of the New York Central, New York City, up to March 4. There will be about 40,370 cubic yards of earth excavation, 455 cubic yards of loose, and 10 cubic yards of solid, rock. Timber in foundations, 26,000 ft.; piles, 5,360 lineal ft.; iron work, 3,000 lbs.; concrete, 1,175 cubic yards; masonry, all classes, 7,870 cubic yards.

The Buffalo City Council has decided upon and proposes to issue, after conferring with the railroads, a severe ordinance restricting the speed of trains over the crossings which it is desired to abolish. The object of this action seems to be to make the railroads move faster in their efforts to make the necessary changes.

Electric Welding of Rails.

A welding train, composed of a dynamo car and a welding car, is being used by the Johnson Co., of Johnstown, Pa., with the result that continuous lines of rails can be made that, buried in the ground, successfully resist variations of temperature found in this climate. In the dynamo car a continuous 500-volt, 275-ampere current is transformed into an alternating current of 650 amperes and 300 average E. M. F. After passing through an adjustable reactive coil the current enters the primary of the welding transformer, of which there are two, with oil insulation. The welder can be operated without danger from electric shocks in a pouring rain.

The cars are equipped with electric motors for manipulating the welders, grinding clean the rail surfaces, moving the cars on the track, pumping water for circulation in the jaws, etc. In operation, two chucks are welded from either side across the joint of the butted rails. The heated rail ends are also forced together by lateral pressure. Four joints can be made in an hour. They break under a strain of 279,000 lbs.; but the extreme longitudinal temperature strain in a 70-lb. rail will not exceed 150,000 lbs.

Sixty-Foot Rails.

The Columbus, Hocking Valley & Toledo road, which has been experimenting with 60-ft. rails and recently placed an order for 2½ miles of that length of rail, has increased that order to 7½ miles of rail.

German Armor Plate Tests.

It is claimed that the Krupps have discovered a new method of hardening and increasing the resistance of armor plates, which has given remarkable results in recent tests.

Cable Abandoned for Electricity.

The Baltimore Traction Company decided last fall to discard the cable on its Gilmor Street Line, and adopt electric motors to save expense. It was shown by estimates submitted with President Brown's report, last October, that a saving of $20,000 a year could be effected. The work is nearly completed, and trolley cars are expected to take the place of those propelled by the cable before the end of the month.

The Gilmor Street Line was a part of the old Citizens' Railway purchased by the Traction Company in 1890. It was one of the best paying roads of the horse car period, and was the second line in Baltimore to be fitted out with rapid transit facilities. The route is six miles long. After the Carey Street extension had been completed, a considerable part of the line was provided with trolley wires to accommodate the cars of this and other lines running over the cable tracks. This necessitated the maintenance of a a double equipment; and making the electrical outfit continuous required comparatively small outlay. The cable appliances will not be removed immediately, and it is proposed to run the engines from time to time, so as to keep the machinery in working order for emergencies.

German Pig-Iron Production in 1894.

The Association of German Iron and Steel Makers publishes the following statistics as the production of pig iron in Germany during 1894: The output of pig iron in the German Empire (including Luxembourg) amounted in December last to 498,233 tons, an increase of 16,324 tons on the previous month, and of 49,592 tons on December, 1893. The December output included 146,217 tons of puddling and spiegel iron, 38,115 tons of Bessemer pigs, 239,239 tons of Thomas pigs, and 74,632 tons of foundry pigs. For the whole year 1894 the output of raw iron has been 5,559,322 tons, against 4,953,148 tons in 1893, an increase of 606,174 tons, or 12.3 per cent.

The Channel Tunnel.

The promoters of the Channel Tunnel Scheme have held another meeting, at which it was stated that the hopes of its originators were undamped; that the mean expenditure on the gigantic scheme during the past year had not exceeded £150; and that the interposition of coalbeds in the course of the borings, regarded by Sir Edward Watkin at the time as an occurrence almost providential, had come to nothing. This is not a cheerful record, but those at the meeting had apparently expected nothing better, and departed, after partaking fully of the flow of moral reflections on international amity and so forth, which, in default of more pertinent matter, was administered by the chairman and speakers at the meeting. The probality is that this generation, at least, will not see the Channel Tunnel, or any equivalent means of communication with France, an accomplished fact.—*Industries and Iron.*

Storage Battery Traction in Paris.

Regarding electric storage battery traction on the lines of the Tramways Nord, at Paris, the *Revue Industrielle* says that the cost per car-kilometer has been found to be 0.53 fr., as compared with 0.56 fr. for animal traction. This, however, does not take into account the cost of battery repairs, which would increase the figure for electric traction quite considerably. The storage battery cars used by the company will seat 52 passengers, and, within the city, run at a maximum speed of 7½ miles an hour. Outside of the city limits the speed can be increased to about 10 miles an hour, and even on the heaviest grades does not fall below about four miles an hour. Each car is equipped with a battery of 108 cells, divided up into 12 boxes of nine cells each. These are united into four groups, each capable of supplying a 50-volt current. Two motors are on each car.

THE SCRAP HEAP.

Notes.

E. V. Debs has started for Lake Superior and the Pacific Coast on a lecturing tour. He proposes to swing around the circle and bring up in New York City.

Mr. Leslie, the inventor of the rotary snow plow, states that one of these machines is now being built in Copenhagen to be sent to Russia. The Union Pacific now has six of them.

Washington despatches report that the Brotherhood leaders who have arrived there advise the employees of the Southern Railway to accept the railroad company's offer in the matter of wages.

A building belonging to the North Chicago Street Railway Company in Chicago was burned down on the morning of Feb. 13, and 170 cars were destroyed. The loss is about $200,000. A car house and 11 street cars were destroyed at Newtonville, Mass., on the same day.

Train No. 1 of the St. Louis & San Francisco was stopped by robbers on the night of Feb. 22 near Aurora, Mo., but by the time they had got the engineman and fireman back to the express car the messenger had got out and run away, and the robbers gave up their job and left.

An agreement has been entered into by the officers of the Southern Pacific and the locomotive engineers in the employ of the company, by which the engineers will be paid by mileage instead of by the day, as heretofore. Under this arrangement wages will be reduced about six per cent., instead of 10 per cent., as the company proposed.

Western papers report that the Lake Shore & Michigan Southern has abandoned the use of the title "America's best railway," and will hereafter use nothing but its official title, the name of the road. An officer of the road, speaking to a reporter, says, with great good sense, that the best way for a road to advertise itself is to take its passengers to their destination in the shortest space of time, and in the best possible comfort.

The Sunset limited train of the Southern Pacific ran from Houston, Tex., to Lafayette, La., on Feb. 17 in 4 hours, 43 minutes. The distance is 218 miles, which makes the rate 46.22 miles an hour. The train stopped eight times, and it is said that these stops consumed 30 minutes, which would make the rate of speed while in motion 51.7 miles an hour.

The pneumatic tube which is used for conveying mails between the post office at Philadelphia and the East Chestnut street branch office has now been in operation more than two years, and Second Assistant Postmaster-General Neilson has renewed the contract for another year. This tube is about half a mile long, and there has been but one interruption in the service since it started, and that was for only a few minutes.

Judge Caldwell, of the United States Circuit Court, has written a letter concerning an application made to the court to order the receivers of the Atchison road to pay certain employees' debts. The Judge refuses to order the receivers to pay out money on writs of garnishment, and says:

Neither the Government nor any of its departments, including the judicial, can be garnished for the salaries, wages or fees of its officers, agents or employees. By an order of the court this rule is applied to the employees of the court in the service of its receivers, and I must decline to vary it to meet your case. The court will not pay the wages of the employee to any one else but the employee himself, nor will it sentence him to dismissal from the service because he does not pay his debts. The court has no authority to punish men for not paying their debts, and to determine whether the employee was able to pay his debts would involve an inquiry into his private affairs and the trial of an issue which the court has not the power nor the inclination to undertake.

Lake Notes.

The 7,000-ton steel ship being built to the order of the newly organized Zenith Transportation Company, of Duluth, will be an innovation in lake affairs, besides being the largest vessel ever built on the lakes. It will be fitted with tubular boilers and triple expansion engines of 2,000 H. P., and will not only have steel hull and decks but steel cabins. The boat will be fitted with every known contrivance for rapid cargo handling, an incandescent light system, in the hold as well as above, and arc lights on the spar deck. The boat will be named Zenith City, and the work of the tubular boilers, in contrast with the Scotch type, will be watched by a board of engineers of the navy department.

A contract has been let for the building of still another big lake vessel, a steel barge of 6,000 tons capacity and 18 ft. draft.

All the eight steamships of the Minnesota Iron Co. are being fitted with towing machines, and all will pull barges, two belonging to the company and the rest whalebacks. The fleet of eight steamers and barges, together with the Pathfinder and Sagamore, will be able to transport not less than a million gross tons of ore in the season.

As yet, no contracts have been closed for ore carrying during the coming season of navigation. Indeed, no sales of ore have been made by the mining companies. No vessels have been chartered by the package freight lines, and but little grain is contracted except for a first cargo from Chicago. The vessel outlook is so far very dull.

Contracts just let for lumber docks by the St. Louis Lumber Co., at Duluth, will increase the lumber dock frontage in the upper harbor there to nine miles, with storage capacity for 200,000,000 ft. All these docks are within a lineal distance of three miles of each other.

The Steel Canal Boat Company, which proposes to build a fleet of 15 vessels, 3 steamers and 12 barges of a modification of the whaleback type, for use on Lake Erie and the Erie Canal, will probably have them built at Cleveland.

A $100,000 breakwater, with concaved face to turn the waves back on themselves, thereby breaking their force, is to be built at Marquette, Lake Superior. It is the first of the kind on the lakes, and but few have been built anywhere.

Iron Mining Notes.

There are 320,000 tons of ore in the stock pile of the Chandler mine, Vermilion range, which means a probable output, if the rate is kept up, of 700,000 tons for the year.

The Norrie mine, Gogebic range, has laid off 250 men, one-fourth of its force, because piling ground is occupied. It has stock piles of nearly 400,000 tons.

All winter 150 men have been engaged stripping the earth off the ore deposit of the Mahoning mine, Mesaba range. They have stripped an area 1000 × 75, and 18 ft. deep. Four acres of the 160 in the deposit will be stripped, and the company will mine 250,000 tons this year. In all the coldest weather of the winter, when a temperature of *fifty-five* below zero has been reached, not a day has been lost.

A hundred horses are engaged in freighting goods from Tower, the northern terminus of the Duluth & Iron Range railroad, to the Rainey Lake and Seine River gold fields, 100 miles. The freight rate is $1 per 100 lbs. against $2.50 a hundred a year ago. The state is asked to put $15,000 into a wagon road to the region.

R. P. I. Non-Resident Lectures.

A lecture in the non-resident series before the students of the Rensselaer Polytechnic Institute will be delivered this evening (March 1) by Mr. H. G. Prout, editor of the *Railroad Gazette*, on the subject of steel rails.

Lectures at the University of Wisconsin.

Wm. McC. Grafton, signal engineer of the Pennsylvania Company, recently delivered a lecture on Signals, before the engineering class of the University of Wisconsin, at Madison.

Coal Production and Consumption.

The British Board of Trade has lately issued some interesting statistics, showing the production, consumption and average values at the mines of the coal raised in the principal coal producing countries. From these figures the following tables have been compiled. For the United States and the United Kingdom the amounts are in gross tons, and for the other countries they are in metric tons:

PRODUCTION, CONSUMPTION AND VALUE OF COAL.

		Production. 1=1,000.	Home consumption. 1=1,000.	Con. per capita.	Av. val. at pit's mouth.
United States....	1883	102,868	102,570	1.91	$1.58
	1893	162,815	161,070	2.41	1.30
United Kingdom	1883	163,737	134,306	3.79	1.14
	1893	164,326	126,863	3.30	1.47
Germany.....	1883	55 943	48.983	1.06	1.19
	1893	73,852	67,311	1.33	1.46
Belgium.....	1883	18,178	14,042	2.45	1.95
	1893	19.410	14,711	*2.48	1.82
France.....	1883	20,759	30,828	0.81	2.44
	1893	25,250	34,552	*0 92	2.42
Austria-Hungary	1883	8,087	9,513	0.25	1.36
	1892	10,293	13.1 7	†0.31	1.45

*For 189?; †for 1890.

During the 11 years, for which returns were collected by the Board of Trade, both the production and home consumption of the United States were higher in 1893 than in any preceding year, but the consumption *per capita* fell from its maximum, 2.43 tons in 1892 to 2.41 tons in 1893. During the period covered by the table the greatest export of coal from the United Kingdom was in 1891, although 1894 has been claimed as the banner year. But the maximum production, consumption and consumption *per capita* was in 1891. There have been five years in which the production exceeded that of 1893, and in all the preceding years up to 1883 both the consumption and consumption *per capita* were higher than in 1893. In only four years, however, has the value been higher than in 1893.

In general, 1893 was the year of maximum production, but in 1891 both the aggregate consumption and the consumption *per capita* were higher. This was also the year of maximum value. Both France and Belgium had their years of maximum production, consumption and value in 1890 or 1891.

Pacific Railroad Land Grants.

The House Committee on Public Lands has ordered a favorable report on the bill of Mr. Caminetti, of California, to forfeit lands heretofore granted to aid in the construction of Pacific railroads. A preamble to the measure states that the Pacific roads are about to default, and that under the Pacific Railroad acts it was provided that if default was made in the payment of bonds "the roads, with all their rights, and also all lands granted by the United States, may be taken possession of by the Secretary of the Treasury for the use and benefit of the United States."

A Proposed Tunnel for Draining Mines.

It is reported that several coal operators on the south side, near Hazleton, Pa., propose to build a drainage tunnel, similar to the Jeddo tunnel, from the foot of Switchback Mountain to the mining district, a distance of about five miles. The mines which it is proposed to drain are the Silver Brook, the Honey Brook, the Audenreid, the Beaver Brook, the Jeansville and probably the Coleraine and Beaver Meadow colleries. Pumping has been found too expensive and insufficient to remove the surface water,

Railroad Co-operative Building & Loan Association.

This is the title of an association organized by employees of the Grand Central Station and vicinity, New York City. It has been running five years and has made loans aggregating over $200,000 in that time. The fifth annual report, just issued, shows that the management is in good hands. The President of the Board is Mr. W. B. Pollock, and the Secretary Mr. W. C. Osborn.

A New Steamer for the C. & O.

The Chesapeake & Ohio Railway Company has awarded to the W. & A. Fletcher Company, of Hoboken, N. J., the contract for a passenger steamer to run between Newport News and Norfolk. She will be 180 ft. long, 28 ft. beam and 10 ft. depth of hold, and will be equipped with steam steering gear, electric lights and all modern improvements. It is expected that she will make the trip between Newport News and Norfolk, a distance of 14 miles, in 40 minutes. One hour is now consumed in the run. The new boat will be ready for service about July.

RAILROAD LAW—NOTES OF DECISIONS.

Carriage of Goods and Injuries to Property.

In Vermont it is held by the Supreme Court that when grain stored in a carrier's elevator is destroyed by a fire not caused by its negligence, its delay in not removing the grain as speedily as it should have done does not render it liable for the loss; the fire, and not the delay, being the proximate cause of the loss.[1]

In Texas it is laid down that loading goods on a car standing on a side track does not constitute a delivery to the railroad company, where the station agent, on being notified thereof, declines to ship the goods, and there is no custom or regulation of the railroad company making such loading a delivery.[2]

In the same State it is held that a carrier cannot excuse delay in the transportation of cattle on the ground of an unusual rush of business on its road.[3]

The Supreme Court of Missouri holds that a railroad is bound only to use the same diligence to save freight stored in its warehouse, at its destination, from fire, as it uses to save its own property, where the shipper has been notified that it is held subject to his order and at his risk.[4]

In Wisconsin it is held that, in the absence of an agreed valuation, a contract for transportation of horses, providing "that the liability of the company shall not, in any event, exceed one hundred dollars per head" for damages resulting from its negligence, is void.[5]

The Supreme Court of Missouri rules that, since domestic animals have free range in Missouri, they are not trespassers on an unfenced railroad track, and the trainmen are bound to keep a reasonable lookout for them, as well as to use care to avoid running over them when seen.[6]

In Iowa the Supreme Court holds that the fact that a landowner is compelled to cross a railroad track on his land to reach a highway, and to pasture his cattle, does not entitle him to an open crossing where such a crossing, by reason of the grade and curvature of the railroad track, would render collisions with stock probable, and would be a source of much danger to persons and property transported by the railroad.[7]

The Federal Court of Appeals holds that the statute requiring carriers to afford all reasonable and equal facilities for interchange of traffic, and forbidding discrimination between connecting lines, is not violated by receiving and forwarding, without prepayment of freight or car mileage, cars of other companies containing goods coming from one locality, and refusing to do so, unless prepayment is made, when the goods are from a different locality.[8]

The Supreme Court of Michigan holds that as much of a railroad company's track and grounds outside of the switches as is necessary for reaching the side tracks, upon which are located coal sheds, is a part of the depot grounds, to which the statutory requirement to fence does not apply, so as to render the company liable for injuries to stock from the mere failure to fence such grounds.[9]

Injuries to Passengers, Employees and Strangers.

The Supreme Court of Minnesota holds that where animals are injured because of a railroad company's failure to fence its road, as required by law, the fact that their owner permitted them to run at large, contrary to law, does not, as between him and the company, necessarily constitute contributory negligence.[10]

In Indiana the Supreme Court rules that when, in consideration of the grant of a right of way, the railroad has agreed to make a crossing for the landowner, and in pursuance thereof built a crossing, with cattle guards and wing fences, and maintained it many years, its successor, having torn out the guards and wing fences, and put in gates in the right of way fence, is liable for injuries to the owner's stock that have strayed on the track by reason of the gate's ill repair, and the absence of the guards and wing fences.[11]

The Federal Court decides that a railroad employee, who is one of a gang of men employed to remove a wreck, cannot recover from the company for injuries caused by the negligence of the wreck master, who has charge of the wrecking car.[12]

In Texas it is decided by the Suprere Court that where a railroad employee, while engaged in filling the water tank of a train, for that purpose standing on a ladder which leaned against the car, and holding the water pipe, is injured by the backing of cars against the train, after the cutting out of a car, he cannot hold the company liable on the theory that there should have been, and he had a right to believe that there was, a rule requiring a warning to be given him before the cars were so backed to be coupled, though, during the week he had been so engaged, warning had been given him; he having knowledge that always, during the 20 minutes the train was at the station, not only was the tank filled, but a car was cut out and the other cars recoupled, and he being in a position and so engaged as to be able to see the cars when coming back.[13]

In the Federal Court it is held that an employee of a railroad may recover for injuries from the derailment of a train by an animal getting on the track through a defective fence for which the company was responsible, though the defect was due to the negligence of a fellow-servant.[14]

The Supreme Court of Mississippi rules that a brakeman who is hurt in uncoupling a car without using a stick, in violation of a rule of the company, cannot recover, even though he acted in obedience to an order of the conductor, "a person having the right to control or direct" his services.[15]

In Texas it is held by the Supreme Court that a release by an employee of his master from liability for a personal injury, in consideration of employment for such time as might suit the master, is without consideration.[16]

In New York the superintendent of repairs of defendant railroad company directed the foreman of the carpenter shop to construct scaffolding for an employee to work on, but he gave no instructions as to the materials or method of construction. The carpenter was without experience in constructing such scaffolding, and, owing to the quality of the materials used, the scaffolding was not of sufficient strength, and the employee was injured by its fall. The Supreme Court rules that defendant was liable for such injuries, as a master's duty to furnish a safe place for his servant to work cannot be delegated to another servant, so as to relieve the master from liability.[17]

In Massachusetts it is ruled that a railroad is not bound to give notice to its experienced engineers of the erection of a post 4 ft. outside the line of passage of a train.[18]

In Texas in an action against a railroad injury to plaintiff's son, eight years old, it appeared that defendant was loading cars from its stockpens; that a lane extended from the pens to the car doors; that it was enclosed by a fence; that, while a car was being moved along, the gang plank, which had not been drawn back far enough, injured the foot of the boy, who had got into the lane, and was standing near the plank. The Supreme Court rules, that the instruction to find for the plaintiff, if the injury was due to "negligence of defendant, in not having its premises enclosed or guarded," was error, since the rule requiring owners to guard dangerous machinery to prevent injury to trespassing children does not apply to stockpens.[19]

In the same State it is held that where a person walking along a railroad track, at a point where a great number of persons were accustomed to walk with the acquiescence of the company, is so startled by suddenly seeing a train, which had approached from the rear to within a few feet of her without warning, that she jumps in front of it, she will not be held guilty of contributroy negligence.[20]

[1] Davis v. C. V., 29 Alt. Rep., 313.
[2] Yonkum v. Dryden, 26 S. W. Rep., 312.
[3] G. C. & S. F. v. McAulay, 26 S. W. Rep., 475.
[4] Abrams v. M. L. S. & W., 58 N. W. Rep., 780.
[5] E. O. S. M. Co. v. White Line, 26 S. W., Rep., 704.
[6] Hill v. M. P., 26 S. W. Rep. 576.
[7] Truesdale v. Jensen, 59 N. W. Rep., 47.
[8] O. S. L. & U. N. v. N. P., 61 Fed. Rep., 158.
[9] Grendin v. R. Co., 59 N. W. Rep., 229.
[10] Erickson v. D. & I. R., 58 N. W. Rep., 822.
[11] T., St. L. & K. C. v. Burgan, 37 N. E. Rep., 31.
[12] McGrath v. T. & P., 60 Fed. Rep., 555.
[13] H. & T. C. v. Strycharski, 26 S. W. Rep., 953.
[14] A., T. & S. F. v. Reesman, 60 Fed. Rep., 370.
[15] R. & D. v. Rush, 15 South. Rep., 133.
[16] G., C. & S. F. v. Winton, 26 S. W. Rep., 770.
[17] Kuhn v. D., L. & W., 28 N. Y. S., 883.
[18] Thain v. O. C. (Mass.), 37 N. E. Rep., 309.
[19] G., C. & S. F. v. Cunningham, 26 S. W. Rep., 474.
[20] T. & P. v. Watkins, 26 S. W. Rep., 760.

LOCOMOTIVE BUILDING.

The Baldwin Locomotive Works have recently received an order for four locomotives from the Toledo, Ann Arbor & North Michigan Railroad.

It is reported that the Southern Pacific is about to order 10 locomotives for use on the Atlantic Division. The Schenectady Locomotive Works is now building 20 engines for this company, 17 of which are for passenger service, the order having been given in December last.

The Baldwin Locomotive Works will build the engines for the Baltimore, Chesapeake & Atlantic Railroad in Maryland referred to a few weeks ago. The number of engines to be ordered by the company has not yet been determined.

The Pittsburgh, Fort Wayne & Chicago Railroad is to build seven new locomotives of the Class "R" type at its shops at Fort Wayne, Ind.

CAR BUILDING.

The Wells & French Co., of Chicago, has an order for 300 additional freight cars for Armour & Co., of Chicago, supplementing an order for 700 refrigerators given some months ago.

The Denver & Rio Grande is reported in the market for 1,000 freight cars.

The Jackson & Woodin Car Company, of Berwick, Pa., has shipped the last of the cars ordered by the Bangor & Aroostook last December. The order was for 620 cars including 240 box, 350 platform, 20 stock and 10 caboose cars.

The New York Central order for freight cars has been given out this week, the order being divided between the Michigan-Peninsular Car Co., and the Buffalo Car Manufacturing Co. The order is for 3,000 box cars, and each company has secured half of that number.

Among recent orders taken by the Memphis Car & Foundry Co. of Memphis, Tenn., is a number of tank cars for the Farrell Car Line Co., of Omaha, Neb.

The Pennsylvania Midland order for freight cars recently given to Murray, Dougal & Co., of Milton, Pa., is for a total of 700 cars, the order including 500 hopper coal cars, 100 box cars and 100 platform cars. The delivery of these cars, however, is to extend over a considerable period. The railroad company at the present time has only 10 miles of railroad built.

The Jackson & Sharp Co., of Wilmington, Del., is building 10 closed cars for the electric lines of the Mantau & Hestonville Railroad at Philadelphia.

BRIDGE BUILDING.

Alliance, O.—The Pennsylvania Company has let the contract for the construction of an iron viaduct 1,200 ft. long over its yards at Alliance.

Baltimore, Md.—The Bridge Committee of Councils will recommend the passage of the ordinance appropriating $10,000 for a foot bridge over the Baltimore & Ohio tracks at the foot of Fulton avenue to connect with Carroll Park; also, a resolution to transfer $4,000 of the Edmondson avenue and $6,000 of the Columbia avenue bridges' appropriations to the account of the North avenue bridge.

Carleton County, Minn.—This county has been authorized to spend $2,000 in building bridges in the county by a bill which recently passed the State Legislature.

Carthage, N. Y.—A bill authorizing a bridge across the Black River canal, between Carthage and West Carthage, has passed the New York Legislature.

Chicago.—The South Park Commissioners have decided to erect a new bridge over the northern inlet in Jackson Park, near the site of the Victoria House, the British building at the World's Fair, which is to be a permanent structure. D. H. Burnham & Co., architects of Chicago, are preparing the plans for the structure, which will have a 60-ft. driveway and sidewalks of 15 ft. on each side.

Cumming, Ga.—A local committee is making an effort to secure authority for building a new bridge across the Chattahoochee River at this town.

Elmira, N. Y.—Council has accepted the bill passed by the State Legislature empowering the City to issue bonds for building two bridges over the river to cost $110,000. The bill will be submitted to the tax-payers at the next charter election.

Farmington, Conn.—The Berlin Iron Bridge Co. has just completed a new truss bridge 136 ft. long over the Farmington river for the Hartford & West Hartford Horse Railway Co.

Golden, Col.—The Board of County Commissioners has let the contract for building a bridge across Clear Creek, near Coors' brewery, to Unger & Westergren of Golden. The bridge is to be 120 ft. long.

Hartford, Conn.—The Berlin Bridge Co. has recently completed a very handsome plate girder bridge on Laurel street. It consists of one span 155 ft. long, with a roadway 36 ft. wide in the clear, and two sidewalks each 8 ft.

wide in the clear. The road-bed is entirely of concrete on buckle plates, no woodwork having been used.

Hamilton, Ont.—A new steel bridge is to be erected over the canal at Burlington Beach. Tenders for masonry have already been received by the Department of Public Works, at Ottawa, and the tenders for the steel work will be called for in a few days.

Herkimer, N. Y.—A bill appropriating $15,000 for repairing the bridge over West Canada creek, in Herkimer county, some miles north of this town, is before the State Legislature for action.

Harnellsville, N. Y.—The Common Council has submitted a proposition to be voted on at the March election, for building a bridge on Main Street, to cost $3,700.

Lathrop, Minn.—The Brainerd & Northern Minnesota Railroad will build a foot bridge across Leech Lake five miles beyond Lathrop, Minn. The length will be 2,000 ft.

Linden, Tenn.—Perry County will issue $15,000 in bonds for building bridges.

Middlesex County, N. J.—A bill has been introduced in the State Legislature authorizing Middlesex County to issue bridge bonds to the amount of $150,000, if necessary, for the construction of new bridges in that county.

Milo Junction, Me.—The Bangor & Aroostook Railroad is to replace the bridge across the Kennebec River at this point with a steel structure with a clear span of 166 ft. This bridge is on that section of the railroad which forms a part of the old Bangor & Piscataquis.

Monongahela, Pa.—Congressman Dalzell has introduced a bill in the House authorizing the Pittsburg, Monongahela & Wheeling Railroad to construct a bridge across the Monongahela River, at a point opposite Monongahela. The channel span must have a clear width of 500 ft. with head room not less than 53 ft. above the level of the water.

Perth Amboy, N. J.—Middlesex County, in which this town is located, is authorized by a bill now in the Legislature to build a new bridge over the Raritan River at this point.

Philadelphia.—Plans have been filed with the Board of Surveyors at Philadelphia by the Pennsylvania Railroad Company, for bridges on the line of that road over Wheat Sheaf Lane, Sepviva street and Richmond street.

Pittsburgh, Pa.—The Rapid Transit Bridge Company, of Pittsburgh, Pa., has been incorporated in Pennsylvania to build a bridge over the Allegheny River from Tenth street to Goodrich street. The directors are: Samuel P. White and Joseph F. Mitchell, New Brighton; William C. Jutte, Augustus Jutte and James W. Lee, of Pittsburgh.

Pittsburg, Pa.—Bids will soon be asked for a bridge over the Youghiogheny River at its junction with the Monongahela, near this city. It will consist of one channel span 525 ft., two approach spans 180 ft., conveying roadway for a street railroad, and a sidewalk.

Pittston, Pa.—The Scoville Island Bridge Co., has been charted with a capital stock of $75,000 to build a bridge over the Susquehanna River, from West Pittston, to Scoville Island. The directors are: Clarence B. Simpson, of Scranton, President; William S. Tompkins, Evan B. Long, and Elisha A. Coray, Jr., of Pittston; and Howard M. Streeter, of Scranton.

Pope County, Minn.—A bill to appropriate $1,400 to construct bridges in Pope County over the Chippewa River has passed the Minnesota Legislature.

Rochester, N. Y.—An appropriation of $50,000 for the construction of a canal bridge at Exchange street in Rochester is carried by a bill now before the State Legislature.

St. Louis, Mo.—The United States Senate Commerce Committee has authorized a second favorable report on the St. Louis bridge bill. After the first report was made objection was raised as to the site, which is near the Eads bridge, on the ground that it would obstruct commerce, and the bill was recommitted. The committee heard the testimony offered by both sides, and has again decided to report in favor of the site originally chosen. There is much opposition to the project at St. Louis, and some Mississippi Valley towns have protested against its construction.

Syracuse, N. Y.—The sum of $10,000 for a canal bridge over West Genesee street in Syracuse is appropriated by a bill now pending in the Legislature at Albany. For the bridge at Clinton street, $665 is appropriated as the state's share of the cost of the structure.

A bill appropriating $15,000 for a bridge over the canal at Salina street in Syracuse has passed the New York Legislature.

Wadena, Minn.—A bill to appropriate $5,000 out of the internal improvement fund to rebuild a bridge over the Crow Wing River, between Wadena and Staples, is now before the State Legislature.

Warren, Pa.—The tax-payers have voted to build a bridge over the river at this place.

Wellsboro, Pa.—The court has approved the reports of the viewers and grand jury recommending the erection of bridges over the Cowanesque river in Westfield and Chatham Townships.

Wilkes-Barre, Pa.—Civil Engineer Ira E. Hartwell has prepared plans for the proposed bridge from Canal to Lincoln streets, spanning the railroad tracks. The plans have not yet been adopted, as the negotiations between the city authorities and the railroad companies have not been concluded. The plans provide for a bridge 890 ft. long, costing $58,000. The city and the traction company are to pay one-third each, and the Lehigh Valley and the Central of New Jersey, one-third.

Wilmington, Del.—The Pennsylvania Railroad Company has agreed to construct a bridge over its tracks where they cross Fourth street, in Wilmington, to be 40 ft. wide and 22 ft. above the tracks. It will cost $50,000, and the city will bear part of the expense.

Winnipeg, Man.—The Board of Works has decided to construct a new steel superstructure for the Osborne street bridge. As stated last week, the cost will be $9,500. Tenders will be called for as soon as the plans will be completed.

Woodland, Conn.—The Berlin Iron Bridge Co. is building an iron bridge over the mill creek at this point, about a quarter of a mile above the Hartford Manilla Co.'s mill. This bridge will lead from the old Cornwall place to Great Hill, a pleasure ground owned by H. J. Wickham. The bridge will be over 250 ft. long.

Woodville, Miss.—J. H. Hitaur, of Knoxville, Tenn., has been awarded the contract for building a bridge across the Buffalo River, to cost $5,000.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Camden & Atlantic, semi-annual, 2½ per cent. on the preferred stock, payable March 15.

Canadian Pacific, semi-annual, 2 per cent. on the preferred stock. payable April 1.

Chicago, Burlington & Quincy, $1 per share, payable March 15.

West Jersey, semi-annual, 3 per cent. on the common stock, payable March 15.

West Jersey & Atlantic, 3 per cent., payable March 15.

Stockholders Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atlanta & Charlotte Air Line, New York City, March 13.

Canadian Pacific, annual, Montreal, Quebec, April 3.

Gulf, Colorado & Santa Fe, annual, Galveston, Tex., March 5.

Missouri Pacific, annual, St. Louis, Mo., March 12.

New York & New England, annual, Boston, Mass., March 12.

Pennsylvania, annual, Philadelphia, Pa., March 12.

St. Louis, Iron Mountain & Southern, annual, St. Louis, Mo., March 12.

Sterling Iron & Railway Co., annual, Astor House, New York City, March 5.

Texas & Pacific, annual, New York City, March 20.

Wabash, annual, St. Louis, Mo., March 12.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Freight Claim Association* will hold its annual meeting in Chicago on March 13. The headquarters will be at the Auditorium. The Secretary is S. A. Mehorter, of Philadelphia.

The *Car Accountants' Association* will hold its next meeting at the Palace Hotel, San Francisco, Cal., on April 16, 17, 18 and 19.

The *Association of Railroad Air-Brake Men* will hold its next annual meeting in St. Louis, Mo., from April 9 to 11. The headquarters will be at the Lindell Hotel.

The *Master Car Builders' Association* will hold its annual convention at Thousand Islands, Alexandria Bay, N. Y., commencing June 11.

The *Master Mechanics' Association* will hold its convention at the same place, commencing June 17. Applications for rooms should be made to J. B. Wistar and Charles W. Crossman, both at Thousand Islands, Alexandria Bay, N. Y.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the fourth Wednesday of January, March, April, September and October, at 10 a. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets on the first Wednesday in each month, at 8 p. m. The headquarters of the society are at 1736-1739 Monadnock Block, Chicago.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m. Address P. O. Box 333.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday in each month at 8 p. m.

The *Western Foundrymen's Association* meets in Room 701, Western Union Building, Chicago, on the third Wednesday of each month. B. W. Gardner, Monadnock Block, Chicago, is secretary of the association

The *Association of Civil Engineers of Cornell University* meets on Friday of each week at 2:30 p. m., from October to May, inclusive, at their association rooms in Lincoln Hall, Ithaca, N. Y.

American Association of General Passenger and Ticket Agents.

The fortieth annual meeting of this Association will be held at the Murray Hill Hotel, New York City, at 11 o'clock A. M., Tuesday, March 19, 1895. The very important matter presented at the last meeting by Mr. C. P. Atmore, relating to an effort to control the issuance of through tickets by unreliable parties, and which was referred to a special committee of seven, viz.: Messrs. Atmore, Roberts, Flanders, Heafford, Thrall, McNicoll and Turk, who were instructed to report at the next meeting, should receive most careful attention, with final action if possible.

The resolutions presented by the Accounting Officers' Association at the last meeting, which have for their object the co-operation of this Association with theirs, in the use of terms to be used as applied to the various kinds of tickets now in use, was by proper action made a subject for consideration at the next meeting. Mr. Geo. H. Daniels will, it is expected, deliver the annual address.

Engineering Association of the South.

The regular monthly meeting of the association was held on Feb. 14, with President Dudley in the chair. The subject "Good Roads" was chosen for the topic for discussion at the next meeting. Professor Schuerman read the first installment of his paper on "A Method of Determining the Probable Volume of Traffic on Railroads."

Engineers' Society of Western Pennsylvania.

The society held a regular meeting at Carnegie Hall, Allegheny, on Thursday evening, Feb. 28. Prof. J. A. Brashear spoke on optical and engineering problems associated in the construction of great telescopes, illustrated with lantern projections. The paper, "Losses in the Steam Engine," read by Mr. W. A. Bole at a previous meeting, was discussed. The chemical section will meet March 1. Mr. E. S. Johnson, chemist of the Black Diamond Steel Works, will read a paper on "The Chemical Institute of Heidelberg."

The Western Society of Engineers.

A business meeting of the Western Society of Engineers will be held in its new rooms, 1736-39 Monadnock Block, Chicago, on March 6. By that time it is expected that the new quarters will be furnished and the library arranged. This meeting will be the first held in the new rooms, which are situated on the 17th floor of the Monadnock and are larger and more convenient than the old rooms in the Lakeside Building. A "housewarming" will follow the business meeting and a large attendance of the members is expected.

Switchmen's Mutual Aid Association.

About 300 switchmen (yard brakemen) met in Chicago on Feb. 24 and reorganized the Switchmen's Mutual Aid Association. Charles Booty, of Chicago, was elected President and C. S. Cusack, Secretary.

The Western Railway Club.

The Western Railway Club met in the Auditorium Hotel, in Chicago, Feb. 19, President Gibbs in the chair and nearly 150 members in attendance. Forty new members were admitted. A report from the Committee appointed to influence the Trustees of the John Crevar Library Fund to devote the library to Science instead of Americana was presented. The Committee was enabled to announce that the library would be distinctly scientific in its nature. The paper on "English Railway Practice," presented at the January meeting by Mr. F. A. Delano, was quite fully discussed, many interesting points being brought out. Track gage, locomotive design and finish, and methods of tie-preserving were chiefly dwelt upon. A report from the Committee on revision of interchange rules was received and will be discussed at the April meeting. A topical discussion on "Stationary Boiler Practice and Shop-Heating," which proved quite fruitful, was opened with a series of suggestive notes offered by Mr. C. M. Higginson, of the C., B. & Q. This topic took so practical and interesting a turn that it was continued until the next meeting, when more elaborate treatment, in the shape of written discussions, drawings of plans, etc., are expected. The meeting closed with the presentation of a paper by Mr. Geo. Gibbs, of the Cen. & St. P., on "Notes on Modern Practice in Signalling," which was written with special reference to the relation of signaling methods to the mechanical department.

PERSONAL.

—Mr. L. J. Forget succeeds Mr. N. K. Connolly as President of the Richelieu & Ontario Navigation Co.

—Mr. L. E. Selders has been appointed Roadmaster of the Texas Midland, with headquarters at Terrell, and the position of Superintendent has been abolished.

—Mr. R. M. Allen, District Passenger Agent of the Chicago, Peoria & St. Louis, has become Assistant General Passenger Agent of the Louisville, Evansville & St. Louis.

—Mr. A. A. Heard, Assistant General Passenger Ticket Agent of the Missouri Pacific Railroad, has resigned and accepted the position of General Passenger Agent of the Northern Steamship Line, with headquarters in Buffalo.

—Mr. Frederick O. Taylor, Assistant Superintendent of Construction on the new bridge at Salt Works, near Pittsburg, was killed Feb. 14 by being caught in the rope of a hoisting engine. He was 35 years old, and lived at Scranton, Pa.

—Mr. F. Roblin, Traveling Passenger Agent of the Plant System, has been appointed General Passenger and Freight Agent of the Canada, Atlantic & Plant Steamship line between Boston and Halifax, and will have his headquarters in Boston.

—Hon. Jason Rogers, of Decatur, Ill., for a number of years a member of the Board of Railroad and Warehouse Commissioners of Illinois, died at Chicago on Feb. 23. He had been a member of the State Legislature, and had held other prominent political offices.

—Mr. Robert Morrell, an inventor of some note, died at Summit, N. J., last week. He was the inventor of the metal tie now being used to some extent on the Delaware, Lackawanna & Western Railroad, and he had patented a number of other track improvements.

—Mr. Howard N. Johnson, a prominent lumber manufacturer in Norfolk, Va., died Sunday night last. He was the manager and treasurer of the Greenleaf-Johnson Lumber Co. and Secretary and Treasurer of the Chowan Railroad & Lumber Co., of North Carolina.

—Mr. John A. Burch, General Agent of the Lake Shore & Michigan Southern Railroad Passenger Department,

died at Buffalo Feb. 13 from neuralgia of the heart. He had been located at Buffalo as Passenger Agent for the Lake Shore Company since 1869, and was one of the best known passenger-men in the country. He was about 70 years old.

—Mr. David Clark, Master Mechanic of the coal branches of the Lehigh Valley Railroad Company, and who for the past 40 years has been Master Mechanic of the Hazleton shops, has resigned. Mr. Philip Wallis, formerly of the Norfolk & Western Railroad, is to be Mr. Clark's successor.

—Col. William Millar, an engineer on the surveys for the extension of the Southern Division of the Kansas City, Pittsburgh & Gulf Railroad in Texas, died in Texarkana, Tex., last week. He was over 71 years of age and had long been prominent in the Western States, and during the war had held important commands.

—Mr. J. J. Coleman, Assistant General Freight Agent of the Chicago, Milwaukee & St. Paul road, in charge of the Lake Superior division, has resigned to accept the position of Manager with the new Wisconsin & Michigan railroad. He will be succeeded by E. D. Sewall Commercial Agent of the St. Paul road at the city of St. Paul.

—Mr. W. A. Stadelman, who has been with the Niles Tool Works Co. as a special representative for many years, has resigned his position with that firm, and after March 1 will be located in New York City as General Eastern Agent of the Brown Hoisting & Conveying Machine Co., of Cleveland, O., and of the Elwell-Parker Electric Co., of America, the latter concern being American agents of a well-known English firm.

—Mr. J. J. Allen has severed his connection with the Mexican Central Railway as Eastern Agent in New York, and returned to Mexico to take up the duties of General Agent in the Republic of Mexico, for the N. Y. & C. M. S. S. Co., "The Ward Line." Mr. Allen's wide experience in Mexican traffic affairs, and thorough knowledge of the details and requirements of the trade, should make him a valuable addition to the company's staff.

—Mr. Ross Smith has been nominated by the Governor of Alabama as State Railroad Commissioner and has been confirmed by the Senate. Mr. W. C. Tunstall, a member of the present commission, who has served 10 years and was renominated, failed of confirmation, and, as stated last week, Mr. Harvey E. Jones was nominated and confirmed as his successor. Mr. H. R. Shorter, Chairman of the Commission, holds over as Commissioner.

—Messrs. Noyes & Hazen, of Boston, have opened an office at 85 Water street as consulting engineers, particularly in water supply, sewerage and drainage. They will make a specialty of filtration. Mr. Noyes has been for 21 years Assistant City Engineer and City Engineer of Newton, Mass., and is now Assistant Chief Engineer of the Massachusetts State Board of Health. Mr. Hazen was for five years in charge of the Lawrence experiment station of the Massachusetts' Board of Health.

—Colonel Mason S. Colburn, who died at Manchester, Vt., Feb. 18, was in many ways identified with the railroad history of Vermont. He was Managing Director of the Bennington & Rutland Railroad at the time of his death, having been a director since 1877. He was formerly a member of the firm of Colburn & Morris, railroad contractors, who built a large portion of the Delaware, Lackawanna & Western Railroad, and had important contracts on the West Shore and nearly the entire line of the Beech Creek Railroad. He was associated with the late Trenor W. Park in various railroad enterprises.

—Mr. Philip Collins, a railroad contractor who built many important railroads in the Eastern States, died at Ebensburg, Pa., last week, aged 74 years. His chief work was done in association with his brother, Thomas Collins, of Bellefonte, Pa. He built many miles of the Pennsylvania Railroad and also completed the Sand Patch tunnel near Cumberland, Md., after a number of contractors had given up the undertaking. His last important contract was in the construction of railroads in Brazil, which proved to be an unfortunate undertaking for him, and by which he lost a good part of a large fortune.

—Mr. S. H. Babcock, General Freight Agent of the Rio Grande Western Railroad, has been appointed General Traffic Manager of that railroad, a position just created. He is succeeded as General Freight Agent by Mr. W. E. Halm, whose headquarters will be at Salt Lake City. Mr. Halm has recently been General Agent of the Southern Pacific at Denver. Mr. Babcock has been with the Rio Grande Western since 1886. He was then appointed Contracting Agent under Mr. J. H. Bennett, who was General Freight and Passenger Agent, but he was afterwards with the Atchison, Topeka & Santa Fe and the Northern Pacific. In 1892 he became General Freight Agent of the Rio Grande Western, when the freight and passenger departments of the railroad were separated.

—Mr. Robert G. Fleming, Superintendent of the Savannah, Florida & Western, died in Savannah, Ga., on Feb. 20, after a short illness, in the 56th year of his age. Mr. Fleming was a thoroughly equipped executive officer in his department, having had in his favor the practical experience which came from service in every department of railroad work, from the shop to the general superintendency of one of the most important lines in the South, which he had held with much ability for over 12 years. Mr. Fleming's first experience in the department of transportation was as Master of Trains of the Charlotte, Columbia & Augusta Railroad, in South Carolina, in 1870. From this position he went to the Atlantic Coast Line in the same capacity, and in 1874 he was called to the Superintendency of the Port Royal & Augusta Railroad, which was at that time practically a wreck. After service with that corporation for eight years, in which time he had succeeded in restoring the property to good paying condition, he was appointed to the Superintendency of the Savannah, Florida & Western Railway, which position, as stated, he held at the time of his death.

Devotion to duty was a cardinal principle in Mr. Fleming's character, not only in matters of great moment, but in the minor details of life. A wife and three children survive him.

—Mr. George C. Smith, formerly Chief Engineer of the Chicago, Burlington & Quincy, died at Chicago on Feb. 19. Mr. Smith resigned his position with the Burlington road in Nov. 1889 to go to South America as Chief Engineer of the Western Railroad of Uruguay and Superintendent of Construction of that line, an important road several miles in length which had the financial support of the Barings of London. The failure of that firm a short time after the work was undertaken compelled Mr. Smith and quite a few other railroad men who had gone to Uruguay to return to the United States. Mr. Smith did not again take up railroad engineering work. Mr. Smith was about 57 years of age at the time of his death. He had rather a varied railroad service and had been machinist and mechanical engineer on the Burlington, Chicago & Northwestern and other lines, and also served as a clerk in a freight office of a Chicago road. In 1868 went again to the Chicago, Burlington & Quincy in its engineering department, and became Assistant Chief Engineer of the road in January, 1880, and finally Chief Engineer in June, 1893, holding that position until his resignation to go to Uruguay.

ELECTIONS AND APPOINTMENTS.

Baltimore & Ohio.—Joseph Wilkens, Jr., has been appointed Supervisor on the Washington County branch, to succeed J. R. C. Wrenshall, transferred to the Philadelphia division.

Delaware, Lackawanna & Western.—At the annual meeting of the company last week, the following officers and directors were elected, 372,000 shares voting. The only change is the substitution of F. W. Vanderbilt for Percy R. Pyne, deceased: President, Samuel Sloan; Secretary, Fred F. Chambers; Treasurer, Frederick H. Gibbens. For Managers, John I. Blair, George Bliss, Eugene Higgins, William W. Astor, William Rockefeller, Henry A. C. Taylor, J. Rogers Maxwell, George F. Baker, James Stillman. Alexander T. Van Nest, Frank Work, Hamilton McK. Twombly, Harris C. Fahnestock, F. W. Vanderbilt.

Findlay, Fort Wayne & Western.—The company will, on April 1, move its headquarters from Findlay, O., to Fort Wayne, Ind., its present western terminus.

Missouri, Kansas & Texas.—General Manager Allen has appointed J. W. Maxwell General Superintendent of the Texas lines.

A. D. Bethard has been appointed Division Superintendent of the Fort Worth, Dallas, Henrietta, Denton and Mineola divisions and Sherman branch, with headquarters at Denison. Mr. T. S. McDowell has been appointed Texas Division Superintendent of the Waco, Houston, San Marcos and Trinity divisions and Belton branch, with headquarters at Taylor, Tex.

Redstone Connecting.—The incorporators are J. E. Ridgway, Philadelphia, President; Caleb S. Ridgway and John J. Bishop, Burlington County, N. J.; William K. Brown and George W. Dohnert, Philadelphia; James McKay and Robert J. McKay, of Pittsburgh.

RAILROAD CONSTRUCTION,
Incorporations, Surveys, Etc.

Brainerd & Northern Minnesota.—This road is getting estimates on the cost of building from its present terminus, south of the Leech Lake reservation, to the north boundary of Minnesota, about 90 miles. As yet no road penetrates this region, which is as large as the State of Maine, and rich in pine and hardwood timber, minerals and agricultural lands.

Choctaw, Oklahoma & Gulf.—A party of surveyors have started west from Fort Reno, Oklahoma, the terminus of its western division, to run a line nothwest through the Cheyenne reservation, the Panhandle of Texas, and Beaver County.

Clearfield, Conemaugh & Western.—The completion of the survey on the Johnstown end of this road will come up for discussion at the annual meeting, to be held at Harrisburg, Pa., on March 5. The road is to extend from Porters to Johnstown, 75 miles. Hon. S. J. M. McConnell, of Harrisburg, Pa., is President, and Samuel Brugger, of Flemington, Pa., is Chief Engineer.

Colorado, Wyoming & Great Northern.—President Carpenter states that the company expects to begin field operations soon upon this new line into northwestern Colorado. B. A. Woodworth, of a Denver investment bond company, authorizes the statement that a sale of the bonds has been made in Philadelphia, and that work on the grade will begin during March. A surveying party has reached Rangely, in Rio Blanco County, and will proceed without delay to cover the 210 miles contemplated to reach a connection with the Oregon Short Line. When first incorporated it was intended to construct a narrow gage line, and the company was incorporated for $1,000,000, but it has since been decided to have the gage of standard width and to increase the bonds and stock to $3,000,000. Amended articles have been filed to cover this change. The road will reach coal, asphalt, timber, stock, marble and agricultural districts in Northwestern Colorado, besides forming connection between the Northwest over the Oregon Short Line and the Denver & Rio Grande or Rio Grande Junction at Grand Junction. For 60 miles out from Grand Junction the survey is established, but beyond Rangely a tunnel will probably be necessary, and from there the route is indefinite. The original directors of the company were: W. T. Carpenter, President; Thomas E. Sanford, Melvin O. Whitehead, Criss F. Lass and James P. Nesbitt. A change will be made in the management in a short time.

Columbia & Kootenay.—This company will build a branch line from its main line to run north through the Slocan County in Southern British Columbia, and connect with the Nakusp & Slocan Railroad. Both of these roads are branches of the Canadian Pacific.

Columbia & Red Mountain.—The surveys for that portion of this railroad located in Washington are now nearly completed. The road, as already stated, was recently incorporated to build an extension of the Spokane Falls & Northern into the mines in the southern part of British Columbia. Mr. D. C. Corbin, the President of the Spokane Falls & Northern Railroad, has for a year or two been endeavoring to secure a charter for a road. He has now gone to Ottawa and expects to have no difficulty in securing a Canadian charter from the Dominion Government. The portion of the road located in Washington will be about eight miles long, the line beginning at Northport on the Columbia River, the present northern terminus of the Spokane Falls & Northern. This part of the road will be built during the coming season. No contracts have yet been given out. The line in British Columbia will make the total length of road about 20 miles.

Fernandina & Western.—This company has been organized at Fernandina, Fla., to build a railroad from Fernandina west to Valdosta, Ga., 110 miles.

Jackson Southern.—At a meeting of the Board of Directors of the company at Jackson, Miss., recently the following officers were elected: T. K. Brown, President; E. E. Carpenter, Vice-President; Alex Fiddes, Secretary; H. L. Strom, Treasurer. Negotiations with the Chicago, Rock Island & Pacific have been begun by the projectors, to secure that company's support in its project for a line out of Jackson, Miss.

Kanawha & Michigan.—Several short lines of railroad are building in West Virginia, which will furnish outlets for coal and timber on lands now undeveloped, to the line of the Kanawha & Michigan Railroad, which follows the Kanawha Valley from the mouth of the river to Gauley Bridge, where it connects with the Chesapeake & Ohio. These roads open up the valleys of Campbells Creek, Bells Creek, and Hughes Creek, all of which empty into the Kanawha River. C. C. Lewis, of Cedar Grove, and George S. Couch, of Charleston, W. Va., have a six mile road along the valley of Campbells Creek, and D. D. Ward, of Detroit, Mich., has a five mile line graded and ready for the rails. Both of these lines will be completed within a few months. Several other short lines are contemplated by the owners of the coal and timber in this section, and a considerable amount of railroad work will be done this summer. J. G. Thompkins and George S. Couch have a force of men at work on the grading of a short line, about four miles in length, up Frozen Branch, a side stream of Kelley's Creek, which they will have completed in a few weeks. The Big Mountain Mining Co., the Cedar Grove Mining Co., the Staunton Coal Co., and the Kelley's Creek Improvement Co., are all opening mines in the region for which these lines furnish an outlet.

Macon, Dublin & Savannah.—The company has petitioned the City Council of Savannah to grant an extension of the grant of terminals made by the city to the company on condition of the completion of the road to Savannah. The grant was extended one year 12 months ago and expires March 1. The terminals consist of 28 acres of land. President Wright has offered to give a guarantee that his company will have 50 miles of railroad completed and in operation from Savannah westward within 12 months, provided the time is extended.

Manchester & Milford.—A charter has been refused to this company by the New Hampshire Legislature. The railroad was projected as a short extension northward from Milford, N. H., of the Brookline & Milford Railroad, which was built last year from Pepperell, Mass., across the New Hampshire State line to Milford, and is now operated by the Fitchburg Railroad. The extension to Manchester, N. H., was also supported by the Fitchburg Railroad and by certain business interests in Manchester. The project, however, met with a good deal of opposition, and the officers of the Boston & Maine and Concord & Montreal also objected to the granting of the charter for the road, which would parallel certain of their lines.

Metropolitan Elevated (Boston).—The Legislative Committee, of the Massachusetts Legislature, voted unanimously to refer to the next Legislature the petition of J. H. Bickford for the incorporation of the Metropolitan Elevated Railway Company.

New Roads.—C. C. Lewis, of Cedar Grove, and G. S. Couch, of Charleston, are interested in building a railroad along Kelly's creek valley to give an outlet to the coal and timber deposits of that section. About six miles have been completed.

Lamar Fontaine & Sons, of Clarksdale, Miss., are constructing nine miles of railroad through some timber land which they own. The total length of the road will be 22 miles, Beler, in Quitman County, being one of the terminals.

North Carolina Roads.—A considerable number of new railroad companies have been incorporated at the present session of thes State Legislature, among those securing charters being the Carolina & Northwestern, the Morganton & Shelby, the Roanoke Railway & Bridge Co., the Sanford, Lillington & Eastern, the Norfolk & Camden, the Carolina & Northern, and the Carolina, Tennessee & Ohio.

Pittsburgh, Monongahela & Wheeling.—A charter was granted at the State Department at Harrisburg, Pa., on Feb. 26, to this railroad company, to build a road 40 miles long. William C. Dacey, of New York, is President.

Pittsburgh & Lake Erie.—Contractors will probably be asked to bid in about a month on the grading for the branch of this road to Fayette City, Pa. The route is from Belle Vernon via the righthand bank of the Monongahela river to Fayette City, 2½ miles. The construction work will be in charge of J. A. Atwood, Engineer of Construction, Beaver Falls, Pa.

Redstone Connecting.—This company was incorporated at Harrisburg, Pa., on Feb. 23, to build a road from a point on Redstone Creek, near Grind Stone, in Jefferson Township, Fayette County, thence in a northerly direction to the village of Perryopolis, in Perry Township, a distance of 10 miles. Jacob E. Ridgway, Philadelphia, is President.

San Francisco & San Joaquin Valley.—This company has now been formally organized, nearly $2,000,000 having been subscribed to the capital stock, and a Board of Directors, of whom Claus Spreckles will probably be the President, has been elected. The purpose of the company is to build a railroad 350 miles in length, extending from San Francisco southerly to Bakersfield, Kern county. The proposed route will practically parallel the Southern Pacific lines through the San Joaquin Valley. The capital stock of the company is to be $6,000,000. Of this amount $2,248,000 has been subscribed, and 10 per cent. of the subscription has been paid in. Claus Spreckles, with $500,000, is the heaviest subscriber.

Santa Fe, Prescott & Phoenix.—The formal opening of the road to Phoenix, Ariz., has been set for March 11. The road runs from Ash Fork, on the Atlantic & Pacific, south to Prescott and thence to Phoenix, Ariz., the entire length of the line being 196 miles. The present managing officials are: F. M. Murphy, President; G. W. Vaughan, Vice-President and General Manager, of Prescott, Ariz.

Southern.—Superintendent Dodson, of the Southern Railway, says that the old iron on the Columbia & Greenville division of the road will be taken up as rapidly as convenience will admit, and heavy steel rails put down instead.

St. Louis, Avoyelles & Southwestern.—Grading has been completed on this road from Bunkle, La., northeast to Longbridge, 13 miles, and it is expected that tracklaying will begin this month. The road is projected from Bunkle, on the Texas & Pacific, northeast to Marksville, 30 miles. Ira W. Sylvester, of Alexandria, La., is Chief Engineer.

St. Louis, Kennett & Southern.—Regular trains are now running from Kennett, Mo., over the new road to Caruthersville, Pemiscot County, one of the southern counties in Missouri.

Tennessee Central.—There are 750 convicts at work on the tunnel of the Tennessee Central at Walden's

Ridge, Tenn. This is the only tunnel on the line of this new road. It will be 650 ft. long.

Toronto, Hamilton & Buffalo.—The superintendent states that trains will be running over this railroad from Brantford to Hamilton, Ont., early in this month. The track layers have reached a point about six miles southwest of Hamilton, known as Mineral Springs Station. The bridge over Binkleys Hollow is almost finished.

Trinity, Cameron & Western.—Grading on the Georgetown & Granger division, 10 miles, has been completed, and bids will be opened and contracts let for bridges and all other work between Georgetown and Granger, Tex., on March 5. Specifications for the work on the Trinity, Cameron & Western have been distributed to contractors. M. P. Kelley, Superintendent of Construction, and Capt. Emzy Taylor have gone to New York.

United Counties.—The inauguration ceremonies in connection with this company took place on Feb. 16, the Lieutenant-Governor of the Province of Quebec being present. Over 100 guests, including members of the Provincial Legislature, assembled at the Grand Trunk station in Montreal and left for St. Hyacinthe, thence to Sorel. The new road covers in all 66 miles, from Iberville to Sorel, and two trains daily have been put on. It is now two years since the building was commenced, under Mr. G. H. Gardiner, Chief Engineer. The road is intended to connect all the leading railroads of the eastern district of the Province, including the Grand Trunk, Canadian Pacific, Central Vermont and the Montreal, Portland & Boston at St. Angele and Rougemont. The officers of the new company are: Messrs. C. D. Maze, President; L. F. Morrison, Vice-President; J. W. Dausey, Manager; A. Asselin, General Agent.

Wiscasset & Quebec.—The first 28 miles of this railroad north of Wiscasset, which is on the coast of Maine, has been opened for traffic, having been accepted by the Maine Railroad Commissioners last week. This road has a gage of 2 ft., and has been building for the last year north of Wiscasset toward Burnham. Much of the money has been secured through local stock subscriptions, and the projectors are now working to secure the balance of $200,000 needed to build the line to Burnham where a connection will be made with the Canadian Pacific.

GENERAL RAILROAD NEWS.

Atchison, Topeka & Santa Fe.—The General Reorganization Committee has as yet reached no understanding with the committee of auxiliary lines, but, if an agreement can be made on terms not too onerous to the main line, that policy will be adopted. Otherwise, if practicable, traffic agreements will be advocated, at least, temporarily.

Augusta Southern.—Stockholders of the railroad will meet in Augusta, Ga., on March 20 to vote on the question of issuing bonds to change the line from narrow to standard gage. The road is 84 miles long from Augusta to Tennille, Ga., and is operated by W. B. Thomas as General Manager.

Baltimore & Ohio.—The earnings have been reported for the month of January as follows:

	1895.	1894.	In. or dec.
Gross earn....	$1,661,500	$1,541,000	I. $120.5 0
Operating exp.	1,295,500	1,247,500	I. 48,000
Net. earn	$366,000	$293,500	D. $72,500

For seven months ended January 31:

	1894.	1893.	
Gross earn	$13,733 756	$14 381,908	D. $648,152
Operating exp.	9,323.413	9,531,326	D. 207,913
Net earn	$4,410,343	$4,850,582	D. $440,239

Canadian Pacific.—The directors of the company have declared a half yearly dividend of two per cent. on the preference stock, but in view of the continued decrease in earnings the Board decided that it would not be prudent to pay any dividend on the ordinary shares for the last half of the year 1894.

Central of Georgia.—The failure of the proposed reorganization plan published last summer is now formally announced. This plan was prepared by Messrs. Samuel Thomas and Thomas F. Ryan, of New York City, who proposed the reorganization of the company and its operation independent of the Southern Railway. Messrs. Thomas and Ryan and others interested in the property are now preparing a new plan of reorganization with certain favorable concessions to the Southern Railway, which it is expected will assume control of the railroad and operate it, as was done by the Richmond & Danville before the lease was annulled. Certain of the bondholders of the branch roads and other underlying securities have announced that they will oppose any additional concession to the Southern Railway Company and will endeavor to secure control of their properties and operate them separate from the other parts of the Central of Georgia.

Chesapeake & Ohio.—A general meeting of stockholders was held at Richmond, Va., on Feb. 25. Action was taken to confirm the contract made by the directors for the use of Louisville & Jefferson Bridge property in Louisville and Jefferson County, Ky., and Jefferson, Ind., and for the acquisition of the securities of that company, and to execute a guaranty with the Cleveland, Cincinnati, Chicago & St. Louis, of the mortgage bonds of the Louisville & Jeffersonville Bridge Company for a sum not exceeding $5,000,000, bearing four per cent. interest.

Chicago, Milwaukee & St. Paul.—The earnings for January are of some considerable interest and show an increase in net earnings over 1894, by a heavy reduction in operating expenses, the reports for many months having shown decreases in net earnings:

	1895.	1894.	1893.
Gross earn.	$1,894,377	$2,154 822	$2,686 760
Oper. expenses and taxes.	1,284,918	1,548,366	1,987,060
Net earn	$639 489	$606.456	$699,700
Prop. expense to gross earn.	67¾	70¾	73⅞
Net 7 months	5,973,522	7,179,110	7,874.458

Choctaw, Oklahoma & Gulf.—The annual report of the railroad company for the year ended Dec. 31, 1894, has been issued. It shows gross receipts from the railroad department of $269,276, increase $4,028; operating expenses, $177,693, increase, $4,811; net earnings, $91,582, decrease, $782. Gross receipts from the mining department of $595,171, decrease, $16,474; expenses, $311,027; decrease, $27,147; net earnings, $84,144, increase, $10,673. The total net earnings from both departments were $175,727; taxes and rents, $8,743; net profit, $166,983, an increase over 1893 of $7,812. Under the plan of reorganization the annual interest (including the income mortgage bonds, on which the interest is payable only when earned) will amount to $321,200. As the net profit last year on the 97 miles of road in operation was $166,983 it is believed that the additional 121 miles, which is now being built and which will be completed early in the spring, will net a sufficient increase in profit to more than pay full interest on the bonded debt. The company's principal revenue is derived from the products of its mines; last year it equaled 49.91 per cent. of the whole, while of the total tonnage 87.26 per cent. came from the mines. The output of coal increased 9,953 tons to a total of 360,520 tons, and would have been greater had it not been for the coal strike last spring.

Cleveland, Cincinnati, Chicago & St. Louis.—The company has begun a number of condemnation proceedings for the possession of the several squares of property on which the freighthouses at Louisville are to be located. Large forces of men are now engaged on both the Louisville and the Jeffersonville approaches to the bridge, and the work is nearing completion. It is not the intention to use the bridge regularly until the freight terminals have been completed.

Cincinnati Southern.—Judge Lurton, of the United States Circuit Court, has issued an order allowing the Cincinnati, Hamilton & Dayton interest to take an appeal from the decree issued by him at Nashville, which orders the foreclosure and sale of the property secured by the Cincinnati extension bonds. This will prevent the sale of the Cincinnati Southern property, which had been announced to take place under this decree. Judge Lurton's action in allowing the appeal is looked upon by the Cincinnati, Hamilton & Dayton interest as of much importance to them in the contest with the minority bondholders for the control of the Cincinnati Southern property.

Columbus & Western.—In the United States Court, at Montgomery, Ala., Judge Bruce has granted a decree foreclosing the mortgages of the Farmers' Loan & Trust Co., of New York, on the Columbus & Western Railroad. This line is a division of the Central Railroad of Georgia, and the mortgages foreclosed are on first-mortgage bonds of $800,000, with interest increasing the amount to $934,328 in total. No date of sale was fixed.

Illinois Central.—The company has arranged to extend the £500,000 first mortgage sterling loan, due April 1 next, to April 1, 1951, at four per cent. These bonds were issued in 1875, and are a first mortgage on 706 miles of road. As they bear six per cent. interest their extension will effect a saving to the company of $50,000 per year interest charge.

Lehigh Coal and Navigation.—The report for the year ending Dec. 31 is summarized in the following statement:

	1894.	1893.	1892.
Gross revenue	$1,338.731	$2,401,667	$2,224 711
Expenses and charges	1,202.824	1,230.651	1,230,067
Surplus	$635.907	$1,171,016	$994,644
Dividends (4½%)	645,599	(5%) 860,799	789,065
Surplus	(Def.) $9,692	$310,237	$205.579
Sinking fund and deprec'n.		218,718	119,915

	1894.	1893.	Changes.
Coal tonnage	5,164.864	6,007,637	D. 842.773
Gross earnings of system	$1,207.930	$2,229,804	D. $1,021,874
Rental ⅛ of gross	1,462,613	1,743,268	D. 340,625

Merchandise earnings fell off $124,830 and coal earnings $899,828. Passenger earnings increased $2,786. The coal production was 1,386,482 tons, a decrease of 58,859 tons.

New York & New England.—The lower House of the Connecticut Legislature has passed the act to provide for the incorporation of the purchasers of the property and franchises of the New York & New England Railroad Company covered by the second mortgage dated June 22, 1882, and made to W. T. Hart, Frederick J. Kingsbury and E. C. Fitz as trustees. The capital stock is fixed at $5,000,000 preferred stock, and $20,000,000 common stock. The corporation may issue $17,000,000 worth of first mortgage bonds, $10,000,000 to be reserved for paying and retiring the existing first mortgage bonds.

New York, Lake Erie & Western.—The time limit for assents of the consolidated second mortgage bondholders to the proposed reorganization plan expired on Feb. 16. Over 90 per cent. of the bonds have assented. Definite steps toward carrying out the proposed plan of reorganization are not likely to be taken until action has been formally taken on the coupon maturing June 1, 1895. In case of default, considerable modification in the plan is expected to be necessary. Default seems to be pretty certain, and more radical measures will undoubtedly have to be taken for reorganization than are provided for in the plan proposed by Drexel, Morgan & Co.

Union Pacific.—The company's operations for December show, for the whole system, a gross decrease of $362,748, and a net loss of $262,695, expenses having been reduced $100,053. For the year, gross earnings fell off $4,607,006 from 1893, while operating expenses were reduced $1,129,948, leaving a net loss of $3,477,057. The Oregon Short Line & Utah Northern is the only line to show increased earnings, and they were but $2,129 larger, while the operating increase was $66,305. The detailed earnings follow:

UNION PACIFIC.

December.	1894.	1893.	Inc. or dec.
Gross earnings	$1,101,695	$1,299.332	D. $197.636
Operating expenses	809,813	821,622	D. 11,808
Net earnings	$291,882	$474,710	D. $182,828
Mileage	1,822	1,822	
Year to Dec. 31;			
Gross earnings	$14,789,436	$17,376,792	D. $2,587,355
Net earnings	4,632.176	6,798,524	D. 2,166 348

OREGON SHORT LINE & UTAH NORTHERN.

December.			
Earnings	$387,177	$385,047	I. $2 129
Net earnings	69,069	133,244	D. 64,175
Year.			
Gross earnings	$5,046,682	$5,861,634	D. $814.952
Net earnings	1,372.975	2,299,488	D. 926,513

GRAND TOTAL OF UNION PACIFIC LINES.

December.			
Gross earnings	$1,713,874	$2.076,623	D. $362,748
Operating expenses	1,261,216	1,361,270	D. 100,053
Net earnings	$452,657	$715,353	D. $262,695
Mileage	5,356	5,287	I. 69
Year.			
Gross earnings	$23,254,828	$27,861,824	D. $4,607.006
Net earnings	6,169,188	9,946,246	D. 3,477,057

Union Pacific, Denver & Gulf.—Judge Riner, of the United States Circuit Court, at Denver, has denied the petition of ex-Gov. John Evans to intervene in the foreclosure suit brought by the American Loan & Trust Co. against the Union Pacific, Denver & Gulf Railroad. This suit includes the foreclosure of about $15,000,000 on the Gulf line, and ex-Governor Evans asked in his petition to intervene and defend, and also attack the validity of the bonds.

New York, New Haven & Hartford.—A bill has been introduced in the Connecticut Legislature providing that hereafter new stock of the New York, New Haven & Hartford Railroad be issued in blocks of 10,000 shares each, and sold at auction on 30 days' notice.

Norfolk & Ocean View.—Charles H. and W. A. Barritt, of Pottsville, Pa., have purchased this road, which extends from Norfolk to Ocean View, eight miles. It is narrow-gage, and will probably be operated by electricity. At present it is operated by steam. Ocean View, the terminal of the road, is a summer resort for Norfolk.

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, Feb. 27, 1895.

Eastbound tonnage last week increased nearly 9,000 tons over the preceding week, and this is taken as an indication that rates on grain are not being maintained, the increase in grain shipments alone being some 5,000 tons. The argument in support of this is that present commercial conditions do not warrant any such marked increase unless the 20-cent rate is shaded.

A conference of passenger representatives is arranged for this week to see what can be done to remove the cause of complaint on the part of the Canadian Pacific that the Grand Trunk is disturbing west-bound business by the payment of excessive commissions. Per contra, the Grand Trunk insists that it is forced to do this in self-defence, so long as the Western roads allow the Canadian Pacific to quote differential rates from Canadian territory.

There is no change in the soft coal rate war. Several conferences have been held at various points, but without result. Rates from the Brazil block coalfields have been cut from $1.10 to 70 cents a ton, and from the Illinois fields from 80 to 50 cents a ton. A rumor was current here last week that the Chicago & Eastern Illinois inaugurated the war for the purpose of forcing the Big Four to buy its coal properties along with the road. So far as can be learned, there is nothing in this story, which probably grew out of the negotiations that were carried on some time ago for the purchase of the Chicago & Eastern Illinois by the Big Four. At that time the Big Four would hove bought the road, but would not take the coal properties.

A meeting of the general managers of lines, members of the Chicago Car Service Association, was held last week, at which the sentiment was entirely in favor of continuing the association, even though the Chicago, Milwaukee & St. Paul should stand by its notice of withdrawal. A committee was appointed to revise the rules and endeavor to shape matters so as to overcome the objections of the St. Paul to the association as now being conducted, and it is quite probable that this can be done. Statistics were presented by the chairman showing net collections of $654,203 from the organization of the association, Nov. 1, 1888, to Dec. 31, 1894, with expenses of $142,000, leaving a net revenue of $512,203 for the period covered.

The Atchison, Topeka & Santa Fe has given notice of intention to reduce the one-way eastbound rate from Southern California points $2.50, on the ground that the agreed rates are being openly cut by tickets reading over the Texas & Pacific in connection with various eastern connections. The other roads protest that they are not parties to any such reduction, and claim that the action of the Santa Fe is precipitated and will result in much trouble. A strong effort is being made to induce that road to recall its notice, pending a general investigation.

The shipments of eastbound freight, not including live stock, from Chicago by all the lines for the week ending Feb. 23 amounted to 58,316 tons, against 49,738 tons during the preceding week, an increase of 8,578 tons, and against 58,968 tons for the corresponding week last year. The proportion carried by each road were:

Roads.	WEEK TO FEB. 22.		WEEK TO FEB. 16.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central	6,099	10.5	8,213	16.5
Wabash	5.214	8.8	1,467	3.0
Lake Shore & Mich. South.	4.663	8.0	4,216	8.4
Pitts., Ft. Wayne & Chicago	9,433	16.2	8,186	6.4
Pitts., Cin., Chi. & St. Louis.	10 440	18 0	10.009	20.0
Baltimore & Ohio	3,9 1	6.7	4.587	9.3
Chicago & Grand Trunk	5.882	10.1	2.281	4.7
New York, Chic. & St. Louis	4 808	8.2	4.310	8.6
Chicago & Erie	6,789	11.7	4 693	9.5
C., C., C. & St. Louis	1,987	1 8	1,785	3.6
Totals	58,316	100.0	49,738	100.0

Of the above shipments 7,104 tons were flour, 23,290 tons grain and mill stuff, 9,851 tons cured meats, 8,467 tons dressed beef, 1,406 tons butter, 1,398 tons hides and 5,406 tons lumber.

Mobile Fruit Trade.

Our readers will have noted the fact that for some time past the railroads leading from the Gulf of Mexico northward have found themselves in quite sharp competition for the fruit trade. Until within a year or two New Orleans has had the lion's share, if not a monopoly, of this trade; but latterly vessels have brought bananas to Galveston and Mobile, and the roads leading northward from those cities have seen to it that the fruit was taken to Chicago and other northern cities as fast as the wheels could be made to roll.

The rapid enlargement of the trade at Mobile was due in the first place to the enterprise of Mr. S. F. Keller, of Birmingham, who, in 1892, put on a steamer to bring fruit from Bocas del Toro, United States of Colombia. He secured a small bonus from business men of Mobile and some assistance from the Mobile & Ohio Railroad. For the year ending Aug. 31, 1893, the number of bunches of bananas received at Mobile was 365,610, and for the next year (ending Aug. 31, 1894) it was 1,539,344. The receipts of other tropical products at Mobile during the same time were as follows:

	1893-94.	1892-93.
Cocoanuts	5,018,150	2,936.415
Pineapples	104.810	87,399
Oranges, loose	613,385	163.750
Oranges, boxes	62,718	48,725
Oranges, barrels	319	160
Lemons	27,500	2 278
Plantains	169.175	75,000

The larger part of the oranges, lemons and pineapples came by the Plant Line steamers.

The running of additional vessels to Mobile in the fruit trade has stimulated, to some extent, the exports of Alabama coal from that port. During the year ending Sept. 1 the amount of coal sent out from Mobile Bay was 23,539 tons. Besides this the steamers took for their own use about 30,000 tons.